National Ocean Service
PRODUCT INFORMATION GUIDE

NOAA-NOS Technical Services Publication
External Affairs Staff
January 1984 (Third Edition)

U.S. Department of Commerce
Malcolm Baldrige, Secretary

National Oceanic and Atmospheric Administration
John V. Byrne, Administrator

Ocean Services and Coastal Zone Management
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PREFACE

The National Ocean Service (NOS), a part of the National Oceanic and Atmospheric Administration (NOAA), has historically undertaken significant scientific endeavors relating to the land and water environment of the United States and is a major contributor of hydrographic and oceanographic data in the coastal and Great Lakes regions of the Nation. Because of this historical and vital involvement in the geodetic and oceanic activities of the Nation, NOS management desires to continue to improve the information it furnishes to fulfill the needs of those organizations engaged in economic and scientific activities in the coastal zone.

Today, NOS is in the vanguard of Federal institutions whose missions in the decades ahead will affect the posture of our Nation's scientific advances. Timely and accurate data and information to the user community are essential to insure that NOS products and services are fulfilling the user's needs and that there is an understanding of the mission and functions of the NOS.

This edition of the *National Ocean Service Product Information Guide* is a major revision of the National Ocean Survey Products and Services Handbook, May 1982 (2nd edition). The primary headings include: Geodetic Services, Oceanography, Marine Charting Services, Aeronautical Charting Services, Coastal Zone Management and Marine Operations. The intent is to provide the user of this guide with a graphic representation of the product, illustrating the type of information contained in the text. A price list has been included in the Appendix to provide approximate cost information. As prices are apt to change at any time without notice, the user is advised to contact the appropriate office for further information on prices. An alphabetical index has also been provided for easy reference.

CONTENTS

GEODETIC SERVICES

The NOS Office of Charting and Geodetic Services, National Geodetic Survey (NGS) Division, is responsible for developing and maintaining the National Geodetic Reference System, as defined by the National Networks of Geodetic Control. These networks consist of approximately three-quarters of a million precisely positioned points, known as geodetic control points. These points provide the common base of reference to correlate longitude, latitude, elevation, scale, and orientation throughout the Nation for communication, transportation, and defense systems; boundary and property surveys and land records systems; public utilities; mapping and charting; and a variety of other scientific and engineering applications.

NGS conducts field surveys and research and development activities to improve the collection and dissemination of geodetic data, as well as to improve the understanding of dynamic Earth processes. NGS also provides Federal leadership in developing specifications and standards for conducting geodetic surveys, and the development and application of new surveying instrumentation. It assists State, county, and municipal agencies through a variety of cooperative programs.

HORIZONTAL GEODETIC INFORMATION—LATITUDE, LONGITUDE, AND AZIMUTH

Office of Charting and Geodetic Services

Issuance: Upon availability, normally upon completion of adjustments of a survey project and subsequent processing in the National Geodetic Survey Data Base.

Users: Land surveyors; engineering consultants; regional planning groups; and national mapping and charting agencies; military and utilities.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).

Horizontal Control Survey.

Published *Horizontal Geodetic Information* consists of geographic positions (latitude and longitude), State Plane Coordinates, Universal Transverse Mercator, coordinates, azimuths, and descriptive location information for approximately 250,000 stations in the horizontal control networks of the conterminous United States, Alaska, Hawaii, and Puerto Rico. Most data are derived from precise field surveys using conventional triangulation, traverse, and trilateration methods. The surveys are adjusted to either the North American Datum (NAD) of 1927, Old Hawaiian Datum, or Puerto Rican Datum. Most horizontal control products are presented in booklet form for 30′ x 30′ quadrangle areas, or for congested areas, 15′ or 7-½′ quadrangle areas. In some areas of Alaska, data are in 1° x 1° units due to the sparsity of control. The 30-minute quadrangles are identified by a six-digit number, successively depicting degrees of latitude, longitude, and quadrants of 1° quadrangle.

Coordinate data are also available on magnetic tape, microfilm, or microfiche. Complete control station information is available on these media for limited areas of the country.

Horizontal geodetic data in manuscript form are available for the projects recently adjusted but not yet published. They contain position and descriptive information similar to that found in the published data and are issued by survey project.

VERTICAL GEODETIC INFORMATION—ELEVATIONS

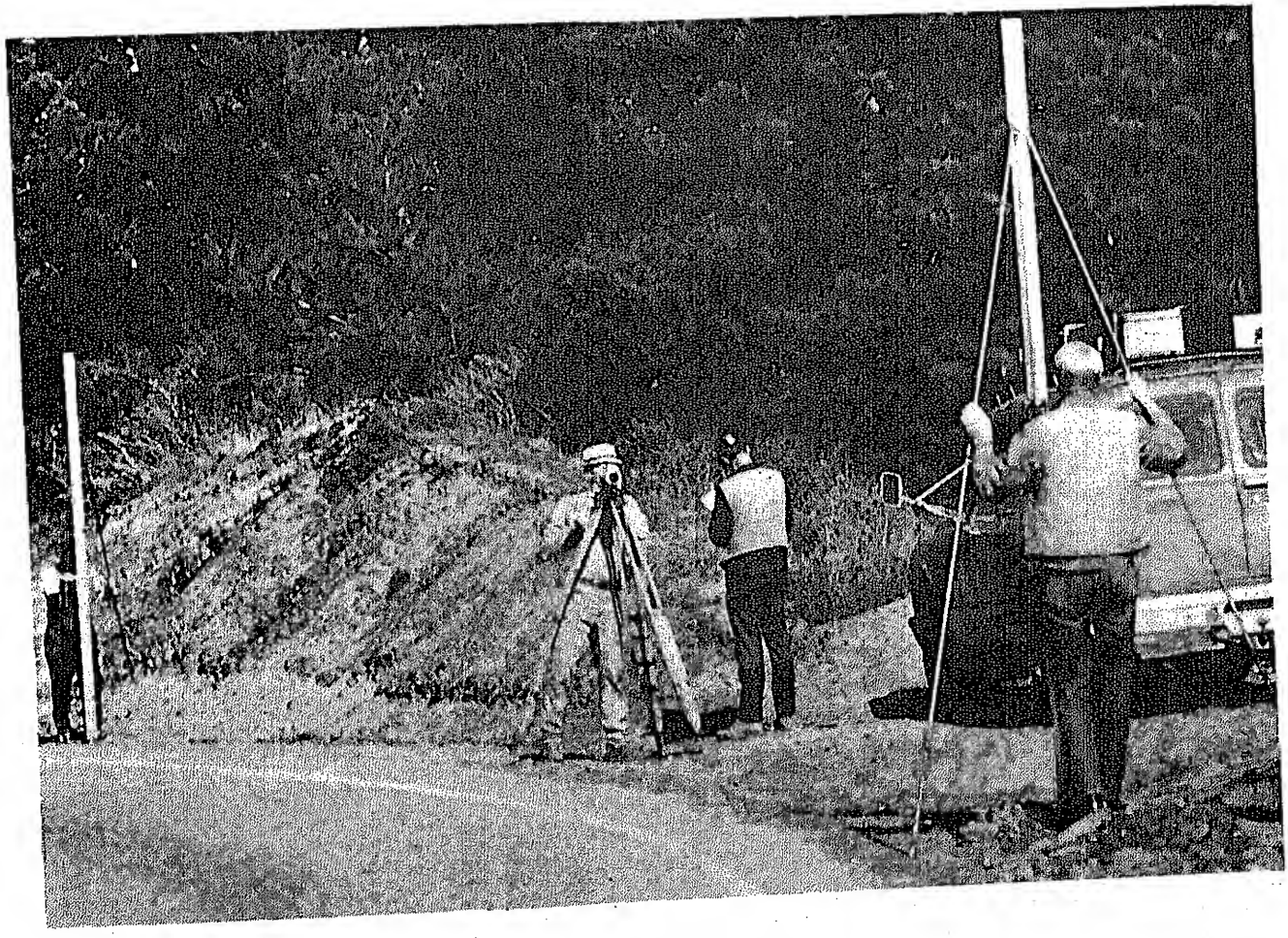
Office of Charting and Geodetic Services

Issuance: Upon availability, normally issued upon completion of a survey project and subsequent processing.

Users: Federal and State mapping, surveying, and transportation agencies, local flood plain and coastal zone management agencies, and coastal and offshore boundary determination programs.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).

Published *Vertical Geodetic Information* consists of absolute elevations above the National Geodetic Vertical Datum (NGVD) of 1929 (formerly Sea Level Datum of 1929) and location descriptions for over 500,000 bench marks in the Nation's vertical control network. The data are derived from leveling observations in the field that have been adjusted to NGVD. For areas of considerable crustal motion, several elevations may be shown for each bench mark for different years of observation. Most Vertical Control Information is presented in quadrangle booklets using the same system described under "Horizontal Geodetic Information." Some Vertical Control Data are still published in the old format organized by State level lines and are available only by complete county coverage. Vertical Control Data for adjusted but unpublished projects are available in manuscript form on a project basis.



Vertical Control Survey.

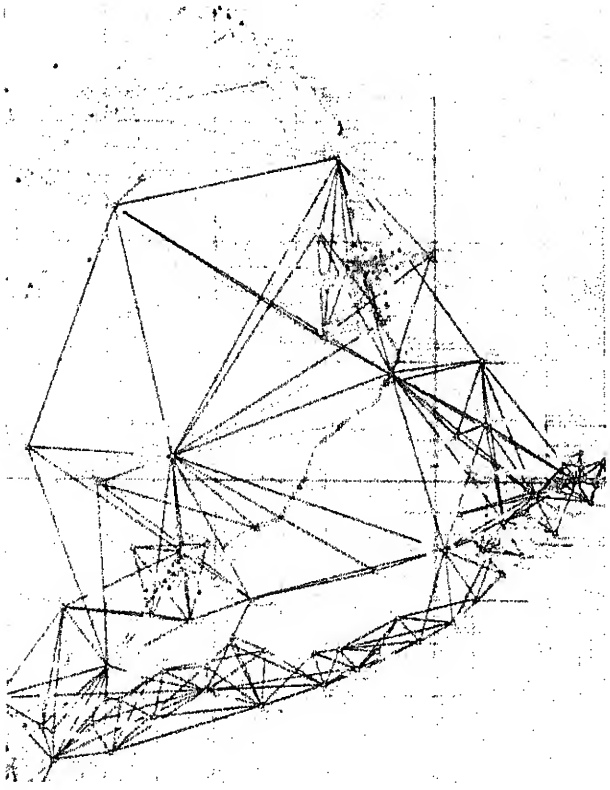
INDEXES TO HORIZONTAL AND VERTICAL GEODETIC CONTROL INFORMATION— GEODETIC NETWORK DIAGRAMS

Office of Charting and Geodetic Services

Issuance: As requested; they are revised and updated at irregular intervals.

Users: Land surveyors, engineering consultants, and surveying and mapping agencies at the Federal, State, and local levels.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).



Geodetic Control Diagram of Hawaii.

Indexes to horizontal and vertical geodetic control information, commonly referred to as *Geodetic Network Diagrams,* depict horizontal and/or vertical geodetic control points. Control points are monuments of known position (horizontal) or elevation (vertical), or both, forming a network by which map details are fixed in their correct position. The diagrams consist of the following series:

The *Geodetic Control Diagram* depicts at a scale of 1/250,000 both horizontal and vertical control for areas of 1° latitude by 2° longitude that were established by the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), and other Federal, State, and local agencies for which data have been accepted for publication by NGS. The diagrams show monumented stations, and certain positioned features, artificial or natural. Lines depict actual observations.

Alaska Geodetic Control Diagrams are depicted at a scale of 1/500,000 and use photo-reduced World Aeronautical Chart bases. A replacement series using NOS Sectional Charts as the base is in production.

The *Triangulation Diagram* is issued for each State and depicts horizontal control established or adjusted by NOAA. The triangulation diagrams show monumented points and positioned features, artificial or natural. Measured angles and distances are depicted.

The *Triangulation Diagram* for coastal areas of the conterminous United States, Alaska, Hawaii, and Puerto Rico use nautical chart bases to depict horizontal and vertical control. Triangulation diagrams using various bases at larger scales, supplement the above diagrams in areas where geodetic control is congested such as metropolitan and coastal areas.

The *Index Map of Control Leveling* is issued for each State and depicts vertical control established or adjusted by NGS. These leveling diagrams show first- and second-order level lines established in the State.

Two diagrams depict horizontal and vertical geodetic control network status. They are updated annually to depict the entire network for the conterminous U.S. and Alaska.

GRAVIMETRIC INFORMATION
Office of Charting and Geodetic Services

Issuance: As requested.

Users: Geologists, Federal, and State surveying and mapping agencies and geophysical prospectors.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).

Gravimetric Information is produced to show the local acceleration of gravity. The intensity of gravity can be predicted for any location within the continental United States. These predicted values are available for a user's specific location and elevation. Gravity data are available for any selected area in the form of punched cards, printed output, and magnetic tape. Individual station values and descriptions are presently unavailable.

Current gravity data include the following information for each 1° x 1° subdivision ("block"): position, elevation, observed adjusted gravity value, free air and bouger anomalies, and the terrain correction.

SUPER BLOCK NO. 114 LOCAL BLOCK NO. 1487

RECORD ADDRESS	LAT DEGS	WLON DEGS	ELEV(METERS) PRIME	SECOND	OBS. GRAV MGAL*1000	SIG	FAA(MGALS)	SIG	BA(MGALS)	SIG	TERR. CORR (MGALS)	SIG	SRCE CODE	T	AG	F	P	STAT ID
1080199	48.517	103.060	709.4	0.0	2738100		20.30	1.00	-59.00	1.00	0.0	0.0	5183	1	1	0	0	296
1080198	48.605	103.060	699.5	0.0	2750900		22.10	1.00	-56.10	1.00	0.0	0.0	5183	1	1	0	0	295
1080095	48.692	103.059	700.6	0.0	2761700		25.50	1.00	-52.80	1.00	0.0	0.0	5183	1	1	0	0	294
1077844	48.879	103.465	683.4	0.0	2774700		16.30	1.00	-60.10	1.00	0.0	0.0	5115	1	1	0	0	293
1077843	48.779	103.157	709.6	0.0	2763600		22.30	1.00	-57.00	1.00	0.0	0.0	5115	1	1	0	0	292
1077840	48.765	103.443	635.2	0.0	2776600		13.70	1.00	-57.30	1.00	0.0	0.0	5115	1	1	0	0	291
1077838	48.982	103.442	609.3	0.0	2799200		8.80	1.00	-59.30	1.00	0.0	0.0	5115	1	1	0	0	290
1077837	48.894	103.004	592.5	0.0	2809300		21.50	1.00	-44.70	1.00	0.0	0.0	5115	1	1	0	0	289
1077836	48.967	103.179	581.3	0.0	2809000		11.30	1.00	-53.70	1.00	0.0	0.0	5115	1	1	0	0	288
1077789	48.663	103.318	695.6	0.0	2756100		20.90	1.00	-56.80	1.00	0.0	0.0	5115	1	1	0	0	287
933628	48.561	103.232	711.0	0.0	2760000		29.20	2.00	-50.20	2.00	0.0	0.0	4086	1	10	0	0	286
933622	48.561	103.076	695.2	0.0	2761300		25.70	2.00	-52.00	2.00	0.0	0.0	4086	1	10	0	0	285
933601	48.879	103.485	694.2	0.0	2787100		22.70	2.00	-54.90	2.00	0.0	0.0	4086	1	10	0	0	284
933600	48.776	103.482	636.6	0.0	2791800		18.90	2.00	-52.30	2.00	0.0	0.0	4086	1	10	0	0	283
933599	48.675	103.449	663.6	0.0	2779600		24.00	2.00	-50.20	2.00	0.0	0.0	4086	1	10	0	0	282
933598	48.983	103.419	601.1	0.0	2814200		11.80	2.00	-55.30	2.00	0.0	0.0	4086	1	10	0	0	281
933597	48.778	103.332	627.3	0.0	2791700		15.70	2.00	-54.40	2.00	0.0	0.0	4086	1	10	0	0	280
933596	48.982	103.266	583.2	0.0	2819600		11.80	2.00	-53.40	2.00	0.0	0.0	4086	1	10	0	0	279
933595	48.881	103.312	598.6	0.0	2806500		12.40	2.00	-54.40	2.00	0.0	0.0	4086	1	10	0	0	278
933594	48.705	103.319	678.3	0.0	2777300		23.60	2.00	-52.20	2.00	0.0	0.0	4086	1	10	0	0	277
933593	48.645	103.317	698.0	0.0	2769800		27.60	2.00	-50.40	2.00	0.0	0.0	4086	1	10	0	0	276
933592	48.981	103.112	576.0	0.0	2829600		19.60	2.00	-44.80	2.00	0.0	0.0	4086	1	10	0	0	275
933591	48.778	103.200	708.6	0.0	2776000		25.20	2.00	-54.00	2.00	0.0	0.0	4086	1	10	0	0	274
933590	48.675	103.186	687.3	0.0	2772600		24.40	2.00	-52.40	2.00	0.0	0.0	4086	1	10	0	0	273
933589	48.880	103.109	612.2	0.0	2812300		22.60	2.00	-45.90	2.00	0.0	0.0	4086	1	10	0	0	272
933588	48.778	103.067	723.7	0.0	2780900		34.70	2.00	-46.20	2.00	0.0	0.0	4086	1	10	0	0	271
933587	48.763	103.068	721.8	0.0	2780100		34.60	2.00	-46.00	2.00	0.0	0.0	4086	1	10	0	0	270
933586	48.720	103.056	710.2	0.0	2778500		33.30	2.00	-46.10	2.00	0.0	0.0	4086	1	10	0	0	269
933585	48.676	103.012	698.6	0.0	2776800		31.90	2.00	-46.10	2.00	0.0	0.0	4086	1	10	0	0	268
933562	48.560	103.342	693.1	0.0	2764800		28.70	2.00	-48.70	2.00	0.0	0.0	4086	1	10	0	0	267
933560	48.546	103.489	644.3	0.0	2772200		22.20	2.00	-49.80	2.00	0.0	0.0	4086	1	10	0	0	266
219277	48.885	103.010	595.0	0.0	2808100		22.00	1.00	-44.40	1.00	0.0	0.0	3578	1	1	3	0	265
219276	48.912	103.317	600.5	0.0	2795800		9.00	1.00	-58.00	1.00	0.0	0.0	3578	1	1	1	0	264
217758	48.908	103.488	684.3	0.0	2776500		15.80	1.00	-60.50	1.00	0.0	0.0	3557	1	1	3	0	263
24187	48.937	103.267	587.0	0.0	2800400		7.00	1.00	-58.40	1.00	0.0	0.0	1528	1	1	3	0	262
24186	48.938	103.005	579.7	0.0	2816900		21.30	1.00	-43.40	1.00	0.0	0.0	1528	1	1	3	0	261
24185	48.938	103.048	579.7	0.0	2814600		19.00	1.00	-45.60	1.00	0.0	0.0	1528	1	1	3	0	260
24184	48.938	103.289	589.8	0.0	2798500		6.10	1.00	-59.70	1.00	0.0	0.0	1528	1	1	3	0	259
24183	48.937	103.114	581.3	0.0	2809900		14.80	1.00	-50.10	1.00	0.0	0.0	1528	1	1	3	0	258
24182	48.937	103.179	583.1	0.0	2805400		10.90	1.00	-54.10	1.00	0.0	0.0	1528	1	1	3	0	257
24181	48.908	103.355	617.5	0.0	2790000		8.70	1.00	-60.20	1.00	0.0	0.0	1528	1	1	3	0	256
24180	48.908	103.442	674.2	0.0	2778300		14.50	1.00	-60.70	1.00	0.0	0.0	1528	1	1	3	0	255
24179	48.908	103.464	675.7	0.0	2778800		15.50	1.00	-60.00	1.00	0.0	0.0	1528	1	1	3	0	254
24178	48.908	103.486	688.8	0.0	2775800		16.50	1.00	-60.40	1.00	0.0	0.0	1528	1	1	3	0	253
24177	48.908	103.377	632.5	0.0	2786700		10.00	1.00	-60.50	1.00	0.0	0.0	1528	1	1	3	0	252
24176	48.908	103.421	663.2	0.0	2780700		13.50	1.00	-60.50	1.00	0.0	0.0	1528	1	1	3	0	251
24174	48.908	103.311	593.8	0.0	2795000		6.30	1.00	-59.90	1.00	0.0	0.0	1528	1	1	3	0	250
24173	48.923	103.114	581.3	0.0	2808500		14.70	1.00	-50.10	1.00	0.0	0.0	1528	1	1	3	0	249
24172	48.923	103.377	621.8	0.0	2790100		8.80	1.00	-60.60	1.00	0.0	0.0	1528	1	1	3	0	248
24171	48.923	103.399	635.5	0.0	2787600		10.50	1.00	-60.40	1.00								247

ASTRONOMIC INFORMATION—LATITUDE, LONGITUDE, AZIMUTH, AND DEFLECTION OF THE VERTICAL

Office of Charting and Geodetic Services

Issuance: As requested.

Users: Federal mapping and surveying agencies; State and local surveying agencies; and private surveying firms and engineering consultants.

For information, write or call: Chief, National Geodetic Information Center; National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).

Astronomic Information includes final results of astronomic latitude, longitude, and azimuth and deflection of the vertical determination for over 2,000 stations in the United States and the U.S. possessions. Astronomic information is listed by station and by 30′ quadrangle locations and is required for the transformation of data between celestial and terrestrial reference systems. In horizontal control surveys, the data often provide the project's orientation.

The printed data elements include station identifiers (QID/QSN and name), both astronomic and geodetic positions (AST/GEOD, LAT and LONG), a measure of precision (SIG), the meridian component (M.C.) and prime vertical component (P.V.C.) of the deflection of the vertical, and the elevation.

QID/QSN	ST	STATION NAME	LAT(AST/GEOD)	SIG	M.C.	PD	LONG(AST/GEOD)	SIG	P.V.C.	PD	ELEV(M)
0380772310001	VA	ACADEMY 1934	38 10 28.87	.27		1	77 16 12.21	.36		1	63.10
			38 10 29.92		- 1.05		77 16 22.56		- 8.14		
0380772310007	VA	ASTRO WEST PIER 1975	38 12 07.63	.13		4	77 22 20.52	.23		2	70.08
			38 12 06.93		0.70		77 22 25.44		- 3.86		
0360824210001	VA	BIG KNOB 1893	36 39 48.68	.50		1	0	.00		0	962.00
			36 39 52.48		- 3.80		82 30 21.76		0.00		
0360771240007	VA	BOONE 1965	36 41 02.15	.27		1	77 08 47.22	.36		1	38.30
			36 41 03.78		- 1.63		77 08 52.97		- 4.61		
0380774140002	VA	BULL RUN 1871	38 52 56.38	.40		2	77 42 17.98	.69		1	419.00
			38 52 53.26		3.12		77 42 12.79		4.04		
0370802220001	VA	CAHAS 1877	37 07 00.46	.50		1	0	.00		0	1038.00
			37 07 01.57		- 1.11		80 00 56.91		0.00		
0360761110002	VA	CAPE HENRY LIGHTHOUSE OLD	36 55 30.32	.50		1	0	.00		0	0.00
			36 55 32.33		- 2.01		76 00 30.52		0.00		
0370763340004	VA	CLAREMONT 1932	37 11 57.43	.27		1	76 59 32.46	.36		1	33.40
			37 11 58.81		- 1.38		76 59 43.75		- 8.99		
0380782120001	VA	CLARK ERDL 1957	38 18 43.72	.26		1	78 00 06.61	.40		1	324.20
			38 18 44.14		- 0.42		78 00 06.43		0.14		
0380782120005	VA	CLARK MTN 1871	38 18 39.55	.50		1	0	.00		0	329.70
			38 18 40.76		- 1.21		78 00 11.69		0.00		
0370764340065	VA	COLUMBUS 2 1966	37 41 24.65	.27		1	76 53 18.43	.36		1	38.30
			37 41 28.73		- 4.08		76 53 25.36		- 5.44		
			0 11.91	.27		1	76 51 58.72	.38		1	38.10
			0 13.82		- 1.91		76 52 04.75		- 4.79		
			′ 28.84	.27		1	77 29 42.61	.40		1	140.00
			).06		- 1.22		77 29 45.01		- 1.88		
			5.10	.27		1	77 02 58.87	.39		1	39.03
			5.85		- 0.75		77 03 06.44		- 6.06		

SATELLITE RADIO SURVEYING INFORMATION—EARTH CENTERED COORDINATE LOCATIONS

Office of Charting and Geodetic Services

Issuance: As requested, normally issued upon completion of adjustment of a survey and subsequent entry into a data base file. Revised and updated at irregular intervals.

Users: Federal mapping and surveying agencies, State and local surveying agencies; and private surveying firms and engineering consultants.

For information, write or call: Chief, Gravity, Astronomy, and Space Geodesy Branch, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8171).

Satellite Radio Surveying Information includes three-dimensional results of satellite Doppler surveys and will include the results of surveys using the Global Positioning System after the system becomes operational. The data consist of point positions in the form of geocentric positions (X,Y,Z) and geodetic coordinates (latitude, longitude, and ellipsoidal height). Relative positions in the form of vector base lines (DX, DY, DZ) are available for simultaneously observed points. Data for transforming satellite positional data to other datums (and vice versa) are also available. These other datums include the North American Datum (NAD) of 1927, the predicted NAD 1983 system, and the World Geodetic System (WGS) of 1972. The data are derived from satellite radio observations performed with geodetic tracking receivers.

G E O D E T I C S U M M A R Y - D O P P L E R S A T E L L I T E O B S E R V A T I O N S T A T I O N

DATE: 09/08/82

L O C A L D A T U M C O O R D I N A T E S

HORIZONTAL FROM TERRESTRIAL OBS	
LATITUDE	N 38 12 6.9291
LONGITUDE	W 77 22 25.4372
DATUM	NAD 1927
ELLIPSOID	CLARKE 1866
ORDER	SECOND- TRIANG
SURVEYED BY	NGS ,
DATA LOCATION	NGIC, NGS, C18

VERTICAL FROM TERRESTRIAL OBS	
ELEVATION (h)	70.08 M.
GEOID HEIGHT (N)	-2.6 M.
ELLIPSOID HT(H=N+h)	67.5 M.
DATUM FOR N	M-R N=0 NAD1927
DATUM FOR ELEV	NGVD 1929
ORDER FOR ELEV	
SOURCE OF N	EXTRAPOLATED-NGS ASTROG. GEOID'75

S T A T I O N I N F O R M A T I O N

STAMPING ON MARK	SOL CODE	STATION NO
ASTRO WEST PIER 1975	1000	50003

CITY OR TOWN	OID	OSN
CORBIN	038077231	0007

COUNTRY	STATE/PROV/TERR	UTM ZONE
UNITED STATES	VA	

O C C U P A T I O N I N F O R M A T I O N

PERIOD OF OCCUPATION	OCC LENGTH	OBSERVED BY
7/21/75 THRU 7/26/75	6 DAYS	BLM

EQUIPMENT	S/N	ECCENTRICITIES (M.)
GEOCEIVER	055	H= .000 E= .000 U= .637

SATS OBSERVED: 30190 30200 0 0 0

T R A N S F O R M E D D O P P L E R C O O R D I N A T E S

WGS 1972 COORDINATES

LATITUDE	N 38 12 7.2574
LONGITUDE	E 282 37 35.0486
ELLIPSOID HT (H)	32.44 M.
GEOID HEIGHT (N)	-37.6 M.

DATUM SHIFT (LOCAL MINUS WGS 72)

DELTA X	23.77 M.
DELTA Y	-160.20 M.
DELTA Z	-180.05 M.

R E D U C T I O N I N F O R M A T I O N

REDUCED BY	DATE	PROGRAM	REJECTION FACTOR
NGS	3/ 4/77	NGS-02	3.0 SIGMA

PASSES INPUT	PASSES USED	OBSERVATIONS INPUT	OBSERVATIONS USED	DEGREES OF FREEDOM
39	37	759	715	674

RESIDUAL RMS	CUTOFF ANGLES PASSES	CUTOFF ANGLES DATAPTS	TIMING BIAS	TIMING BIAS RMS
.15 M.	10.0	10.0	uS.	uS.

A R C H I V A L I N F O R M A T I O N

		TAPE	LOCATION
CAHIER ACCESSION NUM	DS 81	RE1023	ROCKVALL-306
		E12466	IBM-FOB-4
SHELF MARK	863	E12666	IBM-FOB-4
		020806	UNIVAC-FOB-3

MICROFILM REEL NUM ITEM	LOCATION
1. STATION OCCUPATION REPORT	NGS CAHIER
2. DESCRIPTION, RECOVERY NOTES, ETC	NGS, C18 AND CAHIER
3. ADJUSTED GEODETIC CONTROL DATA	NGS, C18
4. SURVEY SKETCH	NGS CAHIER
5. STATION SITE SKETCH	NONE
6. PICTURE POINT IDENTIFICATION	NONE
7. SITE PHOTOGRAPHS	NONE
8. ASTRO COORDINATES	NGS, C152
9. GRAVITY OBSERVATIONS	NONE OR DMAHTC SAT REC DESK
10. OBSTRUCTION SURVEY	NONE
11. STATION OBSERVATION LOGS	NGS CAHIER

REMARKS:

R E M A R K S :

VERIFICATION:

S A T E L L I T E D O P P L E R P O I N T - P O S I T I O N C O O R D I N A T E S A T S T A T I O N M A R K

	COORDINATES	EST ERR (1 SIG)
X	1097028.88 M.	.78 M.
Y	-4897252.69 M.	.21 M.
Z	3923111.78 M.	.98 M.
LATITUDE	N 38 12 7.2805	.54 M.
LONGITUDE	E 282 37 34.7886	.72 M.
ELLIPSOID HT (H)	27.99 M.	.90 M.
GEOID HT (N=H-ELEV)	-42.1 M.	

ELLIPSOID: WGS 1966	COORDINATE SYSTEM	GRAVITY MODEL
A = 6378145.0 M.	NWL-9D	NWL-10E
1/F = 298.25		

CALIBRATION STANDARDS FOR DISTANCE MEASURING INSTRUMENTS

Office of Charting and Geodetic Services

Issuance: As requested.

Users: State and local surveying and mapping agencies, academia, private surveying firms, and surveying associations.

For information on establishing new base lines, contact: Chief, Plans and Resources Staff, (301-443-8218).

For information on existing base lines, contact: Chief, National Geodetic Information Center, (301-443-8631). The address for these NGS offices is: National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852.

Calibration Standards for Distance Measurement Instruments are provided by Calibration Base Lines (CBL's). They are established for the Nation's surveying profession to provide a means to detect constant and scale errors in measuring instruments. Nearly 200 CBL sites have been established by cooperative cost-sharing arrangements between NGS and State and local agencies, universities, and surveying associations. The cooperating organization installs the base line monuments and assists the NGS field party with measuring. A CBL configuration consists of three to five monuments within 1,400 meters positioned with accuracies approaching one part per million. Available CBL data include the adjusted distances between monuments, a description of the CBL monuments, and how they are reached. These data are organized by State. Instructions on how to use or establish a CBL are also available.

US DEPARTMENT OF COMMERCE - NOAA
NOS - NATIONAL GEODETIC SURVEY
ROCKVILLE MD 20852 - APRIL 30, 1982

CALIBRATION BASE LINE DATA
BASE LINE DESIGNATION - VIRGINIA TECH
PROJECT ACCESSION NUMBER - 615767

0040 8270802
VIRGINIA
MONTGOMERY COUNTY

LIST OF ADJUSTED DISTANCES (APRIL 12, 1982)

FROM STATION	ELEV.(M)	TO STATION	ELEV.(M)	ADJ. DIST.(M) HORIZONTAL	ADJ. DIST.(M) MARK - MARK	STD ERROR(
0	649.385	150	647.452	150.0333	150.0333	
0	649.385	430	643.902	429.9845	429.9894	
0	649.385	1000	639.379	999.9978	999.9879	
0	649.385	1400	641.796	1399.9879	1399.9885	
150	647.452	430	643.902	279.9536	279.9761	
150	647.452	1000	639.379	849.9970	849.9763	
150	647.452	1400	641.796	1249.9870	1249.9798	
430	643.902	1000	639.379	569.9837	570.0012	
430	643.902	1400	641.796	970.0131	970.0194	
1000	639.379	1400	641.796	400.0296	400.0369	

DESCRIPTION OF VIRGINIA TECH BASE LINE
YEAR MEASURED: 1981
CHIEF OF PARTY: WJR

THE BASE LINE IS LOCATED ABOUT 10.6 KM (6.6 MI) NORTH OF CHRISTIANSBURG AND ON THE SOUTH SIDE OF BLACKSBURG AT THE VIRGINIA TECH AIRPORT ALONG THE SOUTH WEST SIDE OF THE NORTHWEST-SOUTHEAST RUNWAY.

TO REACH THE 0 METER POINT FROM THE VIRGINIA TECH AIRPORT CONTROL OFFICE, BEAR RIGHT AND FOLLOW TAXIWAY FOR 0.16 K MI) TO MAIN RUNWAY, TURN RIGHT AND FOLLOW RIGHT SIDE OF RUNWAY FOR 0.32 KM (0.2 MI) TO THE 430 METER POINT 150 FEE SOUTHWEST OF EDGE OF RUNWAY, CONTINUE ALONG RUNWAY FOR 0.24 KM (0.15 MI) TO THE 150 METER POINT 150 FEET SOUTHWEST OF RUNWAY, CONTINUE ALONG RUNWAY FOR 0.16 KM (0.1 MI) TO THE END OF RUNWAY AND THE 0 METER POINT 150 FEET SOUTHWES EDGE OF RUNWAY. TO REACH THE 1000 AND 1400 METER POINTS START MILEAGE BACK WHERE TAXIWAY MEETS MAIN RUNWAY, GO NO ON LEFT SIDE OF MAIN RUNWAY FOR 0.32 KM (0.2 MI) TO THE 1000 METER POINT 150 FEET SOUTHWEST OF EDGE OF RUNWAY, CON END OF RUNWAY, BEAR LEFT AND CONTINUE WESTERLY ACROSS RAILROAD GRADE FOR 1.3 KM (0.8 MI) TO THE 1400 METER POINT.

THE 0 METER POINT IS A STANDARD NGS DISK SET INTO THE TOP OF A ROUND CONCRETE MONUMENT 50.8 CM (20 IN) IN DIAMETE WITH THE GROUND LOCATED 46.88 M (153.8 FT) SW FROM THE SOUTH MOST CORNER OF THE SOUTHEAST END OF RUNWAY, AND 45.7 (150.0 FT) SW FROM THE SOUTHWEST EDGE OF RUNWAY. THE 1400 METER POINT IS A STANDARD NGS DISK SET INTO THE TOP OF CONCRETE MONUMENT 50.8 CM (20 IN) IN DIAMETER RECESSED 6 CM (2 IN) BELOW THE GROUND LOCATED 62.79 M (206.0 FT) SE FT HIGH CONCRETE ASTRO PILLAR, 62.18 M (204.0 FT) SW FROM THE SOUTHWEST CORNER OF THE SOUTHEAST SET OF RUNWAY LAN LIGHTS, AND 39.38 M (129.2 FT) NW FROM AN ABANDON RAILROAD GRADE. THE BASE LINE MARKS HAVE NOT BEEN STAMPED AT T THE 150, 430, 1000, AND 1400 METER POINTS HAVE CENTER PUNCH HOLES, NOT CROSSES.

THE BASE LINE IS A NORTHWEST-SOUTHEAST LINE WITH THE 0 METER POINT ON THE SOUTHEAST END. IT IS MADE UP OF THE 0, 430, 1000, AND 1400 METER POINTS.

FOR SITE ACCESS CONTACT MR. BILL BYRNE, AIRPORT MANAGER, POST OFFICE BOX 903, BLACKSBURG, VA. 24060 TELEPHONE (961-6281.

THIS BASE LINE WAS ESTABLISHED IN CONJUNCTION WITH THE CIVIL ENGINEERING DEPARTMENT AT VIRGINIA TECH. FOR FURTH INFORMATION CONTACT, CIVIL ENGINEERING DEPARTMENT, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY, BLACKSBU VIRGINIA 24061. TELEPHONE (703) 961-7147.

COMPUTER PROGRAMS FOR GEODETIC APPLICATIONS

Office of Charting and Geodetic Services

Issuance: As requested.

Users: Land surveyors, engineers, educators, and surveying and mapping agencies at the Federal, State, and local levels, both government and private.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8623).

Computer Programs for Geodetic Applications are available on 9-track tapes. These are written in FORTRAN, ASSEMBLY, or PL1 for use on IBM mainframe computers. Source code and available documentation are included. In addition, geodetic application programs are available for the HP41CV and HP97 desk top computers.

Program	Purpose
TRAV10	To adjust a horizontal geodetic network using observation equations and the method of least squares.
TRAVERSE	To adjust a plane coordinate traverse using condition equations and the method of least squares.
UTMDIR	To compute Universal Transverse Mercator (UTM) coordinates from geodetic positions.
UTMINV	To compute geodetic positions from Universal Transverse Mercator coordinates (UTM).
DIRECT	To compute the geodetic position of a station, given the azimuth and distance from another station.
INVERSE	To compute the distance between two stations, and the forward and back azimuths, given the latitude and longitude for each station.
GPPCGP	To compute state plane coordinates from geodetic positions or vice versa.
VERT02	To adjust a vertical angle survey network using observation equations and the method of least squares.
SPCUTM	To compute UTM coordinates from state plane coordinates.
HAVAGO	To adjust a horizontal and vertical geodetic observation. The program adjusts 18 kinds of observations by the method of variation of parameters in three-dimensions.
LASSO	Subroutines to make it easier for application programmers to use several existing subroutines for forming and solving very large, sparse sets of normal equations. It provides a method of reordering, solving, and computing a portion of the inverse for sparse matrices.
OBSEXAM	To edit horizontal observation data in NGS input format (Blue Book).
OBSDECK	To prepare data from a horizontal project in NGS input format (Blue Book), to input for programs TRAV10 and VERT02.
FIXIF	To provide mass changes to horizontal observation data in NGS input format (Blue Book).
OBSEDIT	To edit vertical observation data in NGS input format (Blue Book).
LEVEL1	To adjust vertical observation data using the method of least squares.

FEDERAL GEODETIC SPECIFICATIONS—SURVEY SPECIFICATIONS AND DATA BASE FORMATS

Office of Charting and Geodetic Services

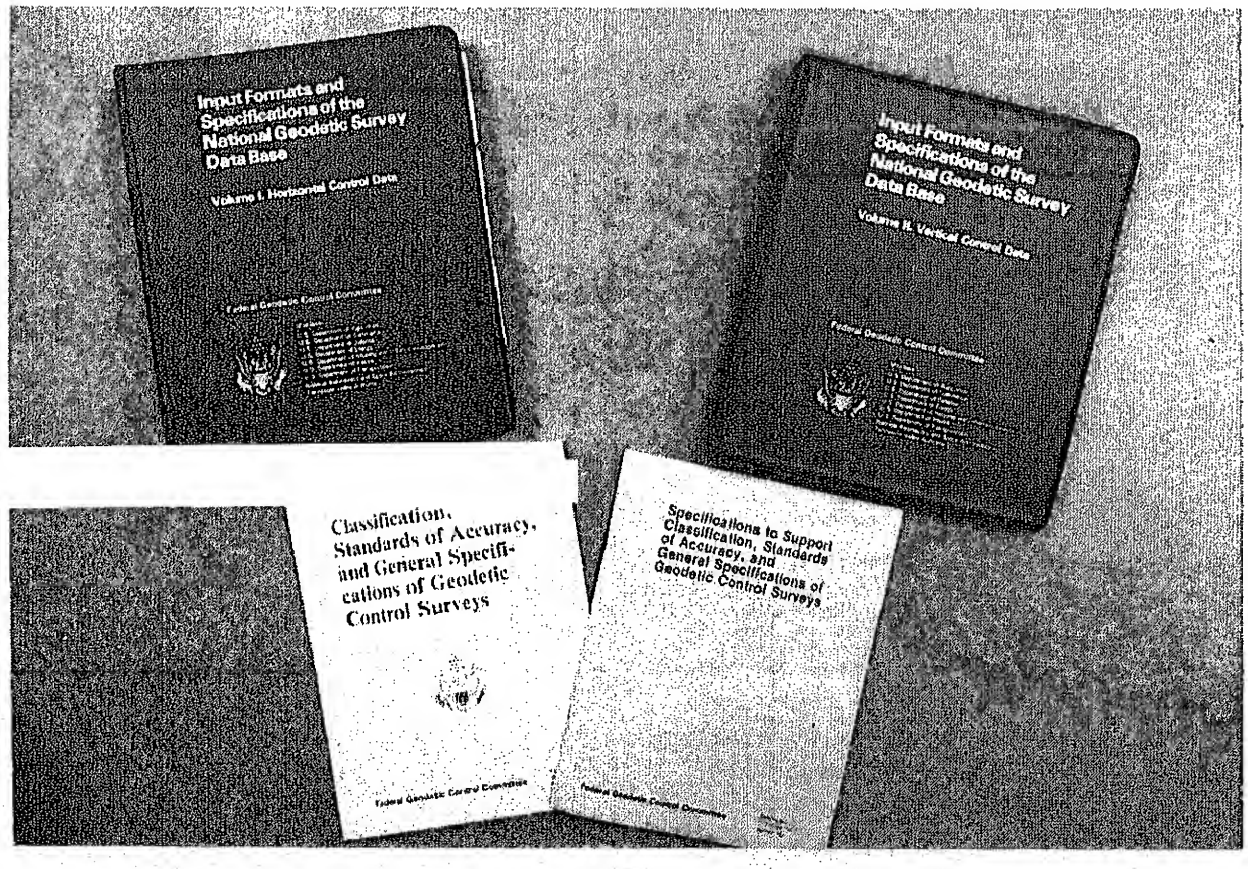
Issuance: As requested.

Users: Federal, State, and local surveying agencies and private companies.

For information, write or call: Chief, Plans and Resources Staff, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8218).

Federal Geodetic Specifications are established by the interagency Federal Geodetic Control Committee (FGCC). Geodetic survey specifications for the United States are contained in two FGCC publications: *Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys* (1974) and *Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys* (1980). A third FCGG publication—*Input Formats and Specifications of the National Geodetic Survey Data Base*—is a user's guide, which gives instructions and specifications for submitting geodetic survey data for entry into the NGS Data Base and their subsequent adjustment and processing for publication by the NGS Data Base Management System.

These publications are provided to Federal, State, and local agencies and private surveying organizations that produce and use geodetic control data.



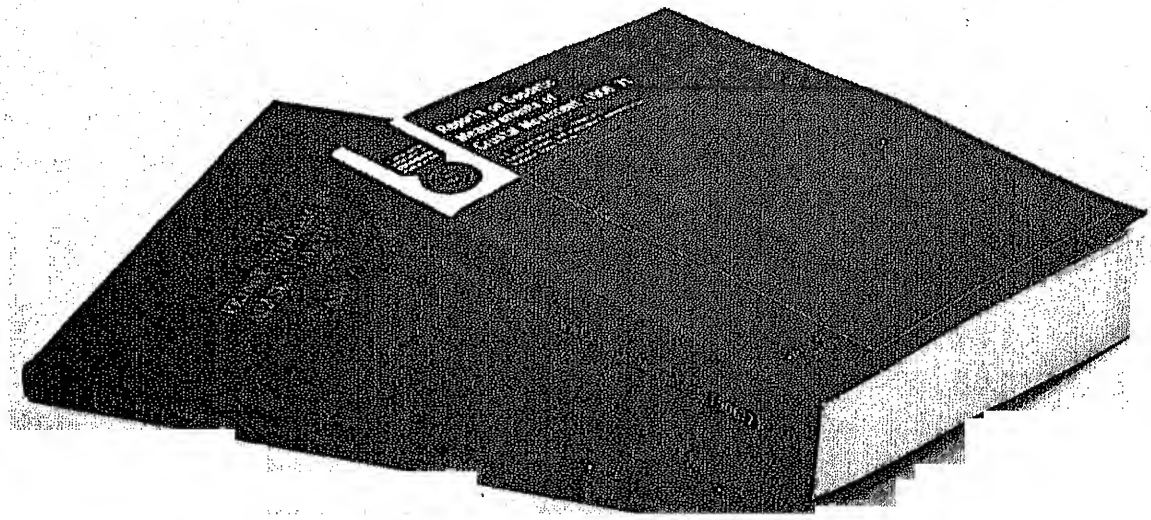
CRUSTAL MOVEMENT INFORMATION
Office of Charting and Geodetic Services

Issuance: As required.

Users: The U.S. Geological Survey; the U.S. Department of Housing and Urban Development; and other organizations concerned with earthquake hazards and flooding in land subsidence areas.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).

Crustal movement information is the records of data gathered from special surveys NGS has performed to quantify and delineate movements of the Earth's crust, plus associated investigations by the NOS Research and Development Laboratory. NGS has periodically conducted horizontal and vertical control and gravimetric surveys to measure changes in the Earth's crust at stations in areas of seismic activity, regional uplift, and land subsidence. The leveling profile library, contains all historic leveling data for active areas, i.e., California and Houston, Texas. The crustal movement information obtained from these surveys is essential to Federal programs in earthquake hazards reduction, nuclear site safety, geothermal energy development, geodetic control network maintenance, and basic ongoing research in the Earth sciences.



POLAR MOTION INFORMATION
Office of Charting and Geodetic Services

Issuance: As requested.

Users: Bureau International de l'Heure (BLH), the International Polar Motion Service, the National Aeronautic and Space Administration, U.S. Geological Survey, and other national and international scientific organizations.

For information, write or call: Chief, Geodetic Research and Development Laboratory, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8423).

The *POLARIS* (POLar-motion Analysis by Radio Interferometric Surveying) network monitors the location of the Earth's axis of rotation using the method of Very Long Baseline Interferometry (VLBI). Observed are extragalactic radio sources to determine polar motion and universal time. Estimates of the X and Y components of the position of the pole, and formal uncertainties are tabulated according to observational dates. Currently, the nominal interval between entries is 1 week. The POLARIS Earth orientation information has applications in high accuracy satellite and space geodesy, geodynamics research, and climatology.

Date			X	σ_x	Y	σ_y	UT1-UTC	σ_{UT1}
y	m	d						
82	1	7	-79.2	2.0	389.8	---	.00306	.00015
82	1	14	-64.4	2.0	400.7	---	-.01246	.00015
82	1	20	-51.3	2.1	409.2	---	-.02717	.00017
82	1	28	-46.3	3.0	417.0	---	-.03828	.00023
82	2	2	-36.0	2.7	422.1	---	-.04866	.00023
82	2	11	-5.6	1.6	429.7	---	-.06812	.00012
82	2	18	6.9	2.0	434.5	---	-.08390	.00017
82	2	25	23.1	3.0	437.4	---	-.09816	.00026
82	3	4	44.8	2.8	439.7	---	-.11739	.00024
82	3	11	77.9	2.7	440.0	---	-.13446	.00023
82	3	25	92.2	2.4	435.4	---	-.16445	.00019
82	3	30	131.0	4.2	432.7	---	-.18070	.00037
82	4	8	111.1	2.7	425.6	---	-.20140	.00024
82	4	14	141.2	2.8	420.9	---	-.21872	.00024
82	4	27	146.0	4.4	404.3	---	-.25001	.00039
82	5	4	181.4	2.1	393.7	---	-.27074	.00017
82	5	11	199.8	2.3	381.1	---	-.28854	.00019
82	5	18	200.3	1.9	366.5	---	-.30080	.00015
82	6	3	226.1	2.3	326.9	---	-.33850	.00019
82	6	8	234.8	2.9	312.0	---	-.34869	.00025

1982 Polar Motion Parameter Determinations from VLBI Observations.

GEODETIC LITERATURE AND RECORDS ARCHIVAL SERVICES

Office of Charting and Geodetic Services

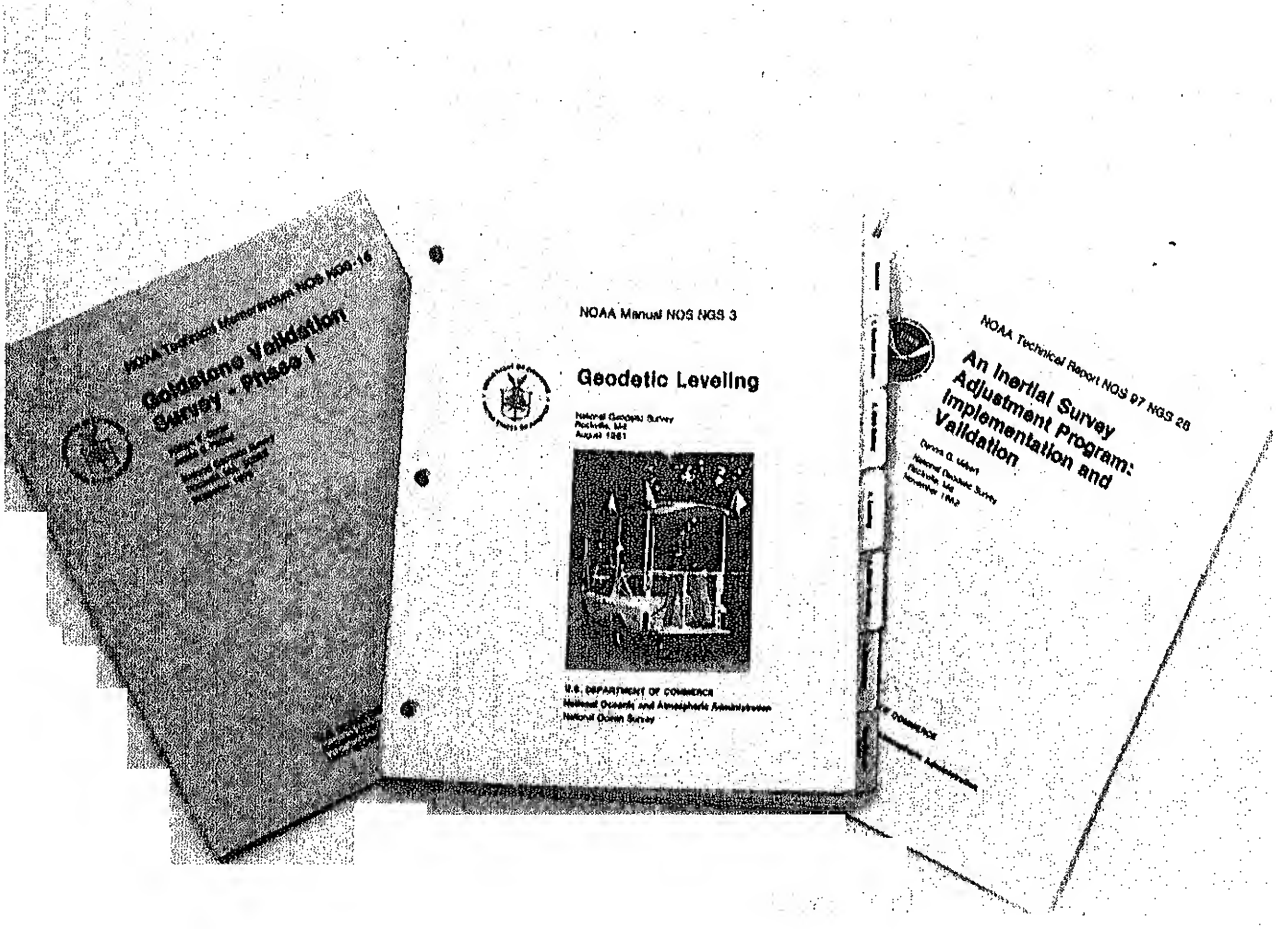
Issuance: As requested.

Users: Federal and State agencies, academia, and scientific organizations.

For information, write or call: Chief, National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8316).

Geodetic Literature and Records Archival Services are available through the National Geodetic Information Center, Geodetic Reference Services Group (GRSG), which maintains a geodetic library. Included are National Geodetic Survey technical reports and memoranda, the publication media for much of the work of the NGS Research and Development Laboratory. The Coast and Geodetic Survey Special Publication series, and other literature concerning geodetic surveying and geodesy are also available. Many of these publications are available to the public for a nominal charge.

In addition, the GRSG catalogs current and archival geodetic records, arranges for retrieval of these records, and researches historic geodetic data upon specific request from NGS users, other agencies, and the public.



GEODETIC PRODUCTS AND SERVICES INFORMATION

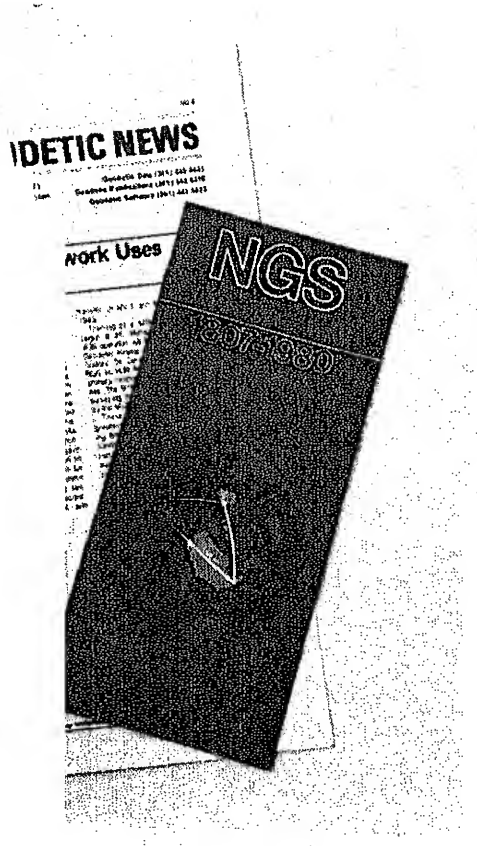
Office of Charting and Geodetic Services

Issuance: As requested.

Users: Land surveyors, engineers, surveying educators, surveying and mapping agencies at the Federal, State, and local levels.

For information, write or call: National Geodetic Information Center, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8631).

The *Geodetic Products and Services Information* program provides geodetic data users with public information materials which describe the geodetic data and services available and how they are obtained. These materials include: an automatic mailing service agreement, a geodetic data price and fact sheet, *The NOAA Geodetic News,* a publications listing and price booklet, and various brochures and pamphlets describing NGS functions and services.



NGS EXTENSION SERVICE—TECHNOLOGY TRANSFER AND CONSULTATION

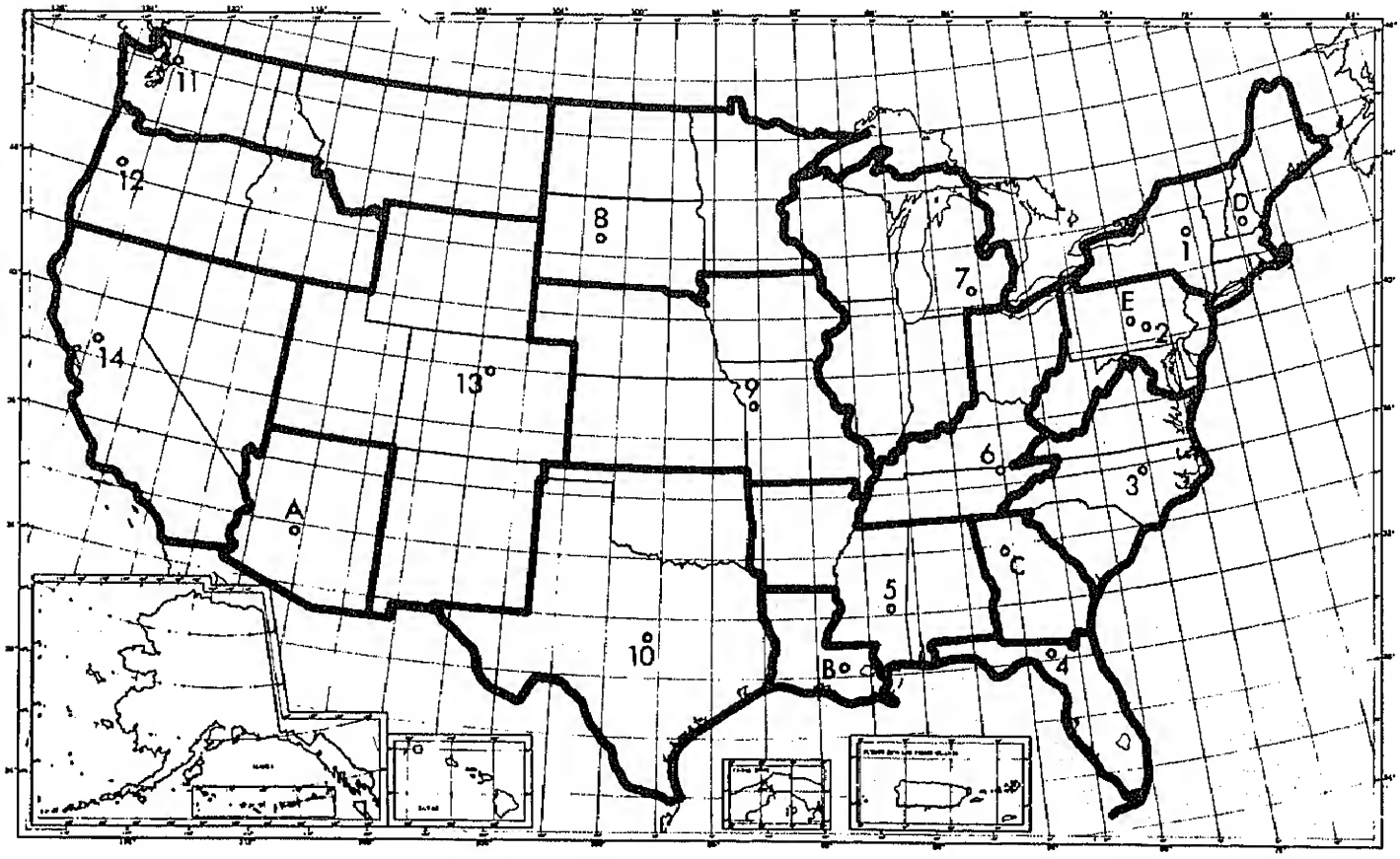
Office of Charting and Geodetic Services

Issuance: As requested.

Users: Federal, State, and local survey agencies.

For information, write or call: Chief, Plans and Resources Staff, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8218).

NGS Extension Service assists State and local governments in performing supplemental geodetic control surveys. The service includes the Mark Maintenance and State Geodetic Advisor Programs. The arrangements for extension services vary according to the requirements of the State or local agency. The Mark Maintenance Program supports the NGS responsibility for establishing and assuring the accuracy and reliability of the Nation's geodetic control networks. Mark maintenance is carried out by 15 field engineers who perform operations to preserve geodetic marks. Mark maintenance engineers also provide liaison, training, and assistance to local, State, and Federal agencies. In turn, cooperation and volunteered assistance from other agencies, such as State highway departments, save marks. Some States have a Geodetic Advisor to provide liaison between the cooperating State and NGS. These States are provided instructional support in the methods and procedures to perform geodetic surveys. The advisor program operates on a cost sharing basis.



Map indicates Regional Mark Maintenance engineers (numbers) and State Geodetic Advisors (letters).

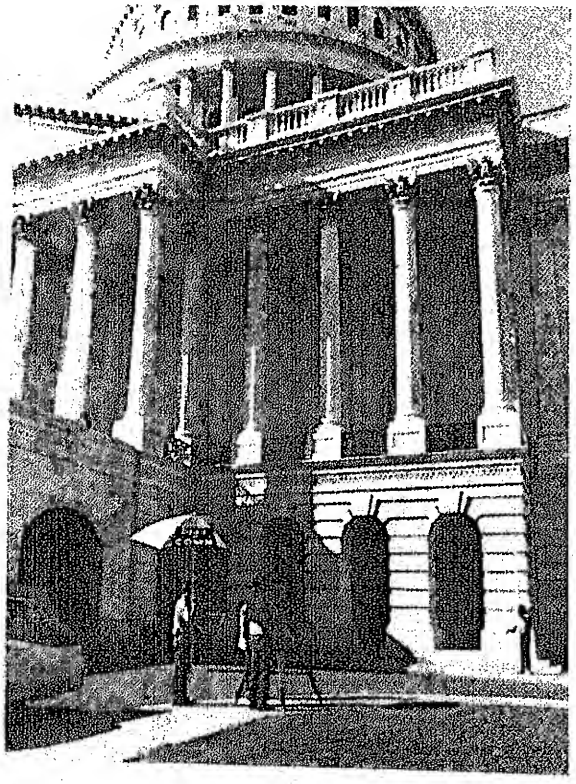
SPECIAL PURPOSE GEODETIC SURVEYS
Office of Charting and Geodetic Services

Issuance: As required.

Users: U.S. Geological Survey, U.S. Department of Defense, and other scientific and engineering Federal and State agencies.

For information, write or call: Chief, Plans and Resources Staff, National Geodetic Survey Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8218).

High precision *Special Purpose Geodetic Surveys* are conducted to support scientific and engineering projects of other agencies and institutions. The special projects usually have unique requirements, designs, and solutions. Two examples of this type of service are: (1) a special survey performed in 1978 at the University of California's Stanford Linear Accelerator at Berkeley, involving the positioning of 12 instruments to millimeter accuracy, and (2) the special resurveys of geodetic figures along the San Andreas Fault Zone in California to detect and measure crustal motion.



Vertical Control Survey at the U.S. Capitol.

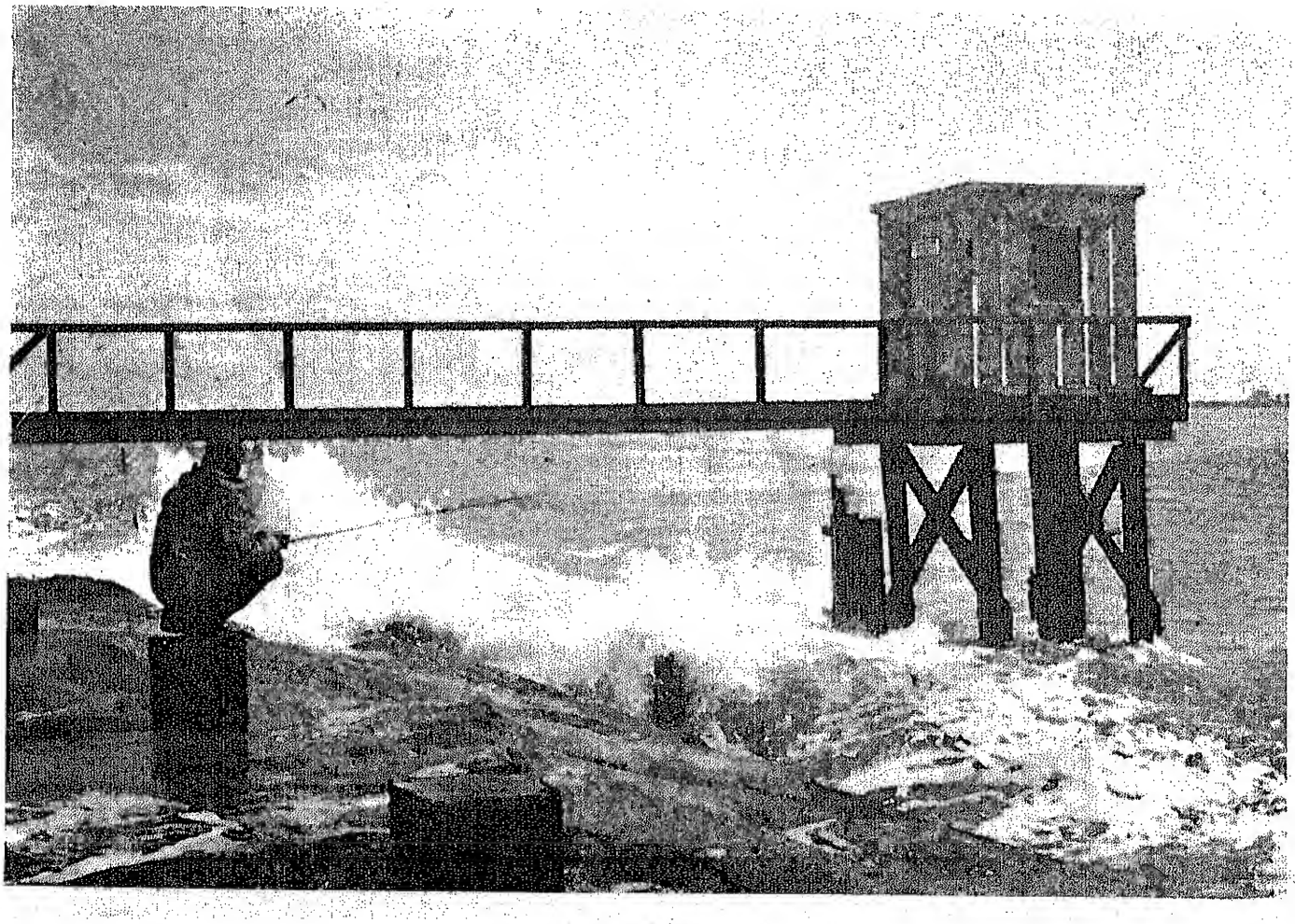
TIDES, 6-MINUTE HEIGHTS
Office of Oceanography and Marine Services

Issuance: Monthly, following processing of observed tide data for each station; all tide data are processed in monthly increments and added to the station data file.

Users: Waterborne commerce, port authorities, marinas, coastal industries, marine engineering and construction firms, academia, State and Federal agencies, foreign governments, and recreational boaters.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Tides, 6-Minute Heights are the compilations of the recorded height in hundredths of feet of the water level for every 6 minutes of each day at tide observation stations. Heights are referenced to a datum. Monthly records of these data are on file for 8,000 tide stations along the U.S. coast, dating back to 1834 for some stations; 120 stations have monthly summaries for more than 100 years; annual summaries are also available. Data for stations maintained in the National Tide Control Network are available on digital magnetic tape. Data for a substantial number of stations not in the network (i.e., installed since 1965) are also available on digital magnetic tape. A large number of stations installed for a short period in support of hydrographic surveys are not digitized, but the data are available in hand-tabulated form.



Typical NOS Tide Station.

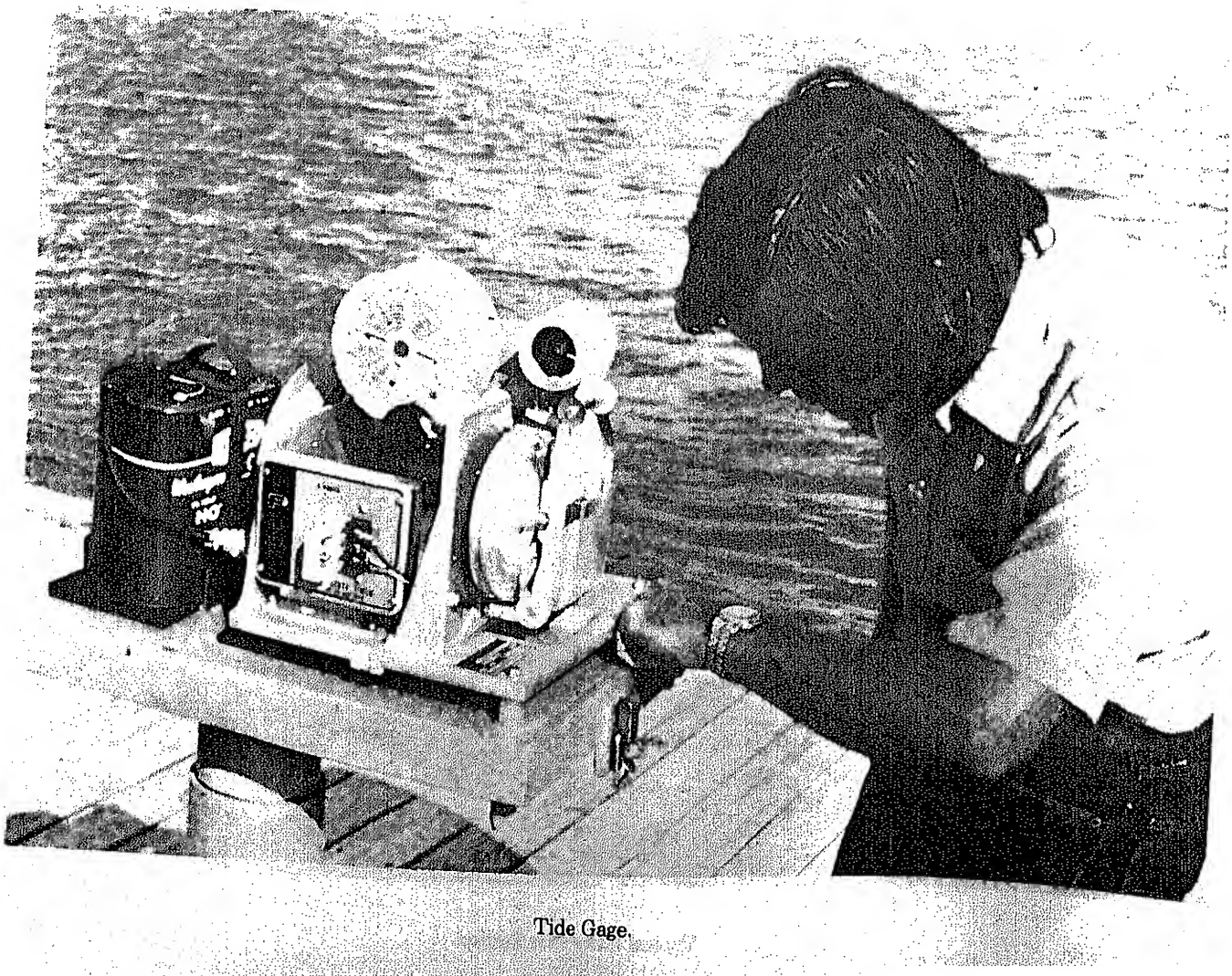
TIDE HOURLY HEIGHTS
Office of Oceanography and Marine Services

Issuance: Monthly, following processing of observed tide data for each station; all tide data are processed in monthly increments and added to the station data file.

Users: Waterborne commerce, port authorities, marinas, coastal industries, marine engineering and construction firms, academia, State and Federal agencies, foreign governments, and recreational boaters.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Tide Hourly Heights are the records of the height of the water level (in feet) on the hour for each hour of each day at tide observation stations. All heights are referenced to a datum. Also, the Office of Oceanography and Marine Services prepares monthly reports and annual summaries of the height of the tide and has records on file for 8,000 tide stations, with data for approximately 200 new stations being added each year. In addition, these files contain monthly records from some stations dating back to 1834 and monthly summaries for 120 stations dating back over 100 years. The records for stations in the National Tide Observation Network (NTON) are available on either hard copy or digital magnetic tape. Records for a substantial number of stations not in the NTON are also available in digital magnetic tape. A large number of stations installed for a short period are not digitized, but data are available in hand-tabulated form.



Tide Gage.

TIDES, TIME AND HEIGHTS OF HIGH AND LOW WATERS

Office of Oceanography and Marine Services

Issuance: Monthly, following processing of observed tide data for each station; all tide data are processed in monthly increments and added to the station data files.

Users: Waterborne commerce, recreational boaters, port authorities, marinas, coastal industries, marine engineering and construction firms, universities, foreign governments, and Federal agencies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Time and Heights of High and Low Water data are the records of the time and heights (in feet) of high tide and low tide recorded each day at tide observation stations located at various sites along the coasts of the United States. Lists of exact locations are available. Two high and two low tides are recorded each tidal day for stations with semidiurnal tides, which predominate throughout the world. One high tide and one low tide are recorded each day for stations with diurnal tides. All of these heights are referenced to a datum. Furthermore, the Office prepares monthly reports and annual summaries of high and low tides and adds records from 200 new stations to its files each year. In addition to maintaining current files of recorded high and low tides, the Office has maintained files for recorded monthly tide data from some stations since 1834, as well as summary tide records for 120 stations for over 100 years. The records for stations in the National Tide Observation Network are available in digital magnetic tape; data for a substantial number of stations not in the network (i.e., installed since 1965) are also available on digital magnetic tape. Data for a large number of stations installed for a short period in support of hydrographic surveys are not digitized, but the data are available in hand-tabulated form.

NEAR REAL-TIME AND REAL-TIME TIDE HEIGHTS

Office of Oceanography and Marine Services

Issuance: Near real-time upon demand to NOS headquarters. Real-time automatically disseminated to users every 6 minutes.

Users: U.S. Coast Guard, National Weather Service, U.S. Army Corps of Engineers, private shipping interests, and State and local agencies involved in flooding, coastal erosion landslides, dredging, and maritime commerce.

For information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8807).

Near Real-Time and Real-Time Tide Heights is a program in which tide heights are measured and converted into digital signals at 6-minute intervals for telemetry through telephone lines and satellites to selected offices with receiving units. NOS has equipped and is operating 11 tide stations under this program and is in the process of installing telemetry instrumentation on primary stations in the National Tide Observation Network (NTON), and on selected stations in areas requiring real-time monitoring. The signals from these stations, telemetered at present to NOS, meet specific user needs, which range from near-continuous telemetry to random short-term transmissions. The data include unedited measured tide heights to the nearest 10th of a foot for a tide station, the time of measurement, onsite observer input, quality control parameters, and the station identification.

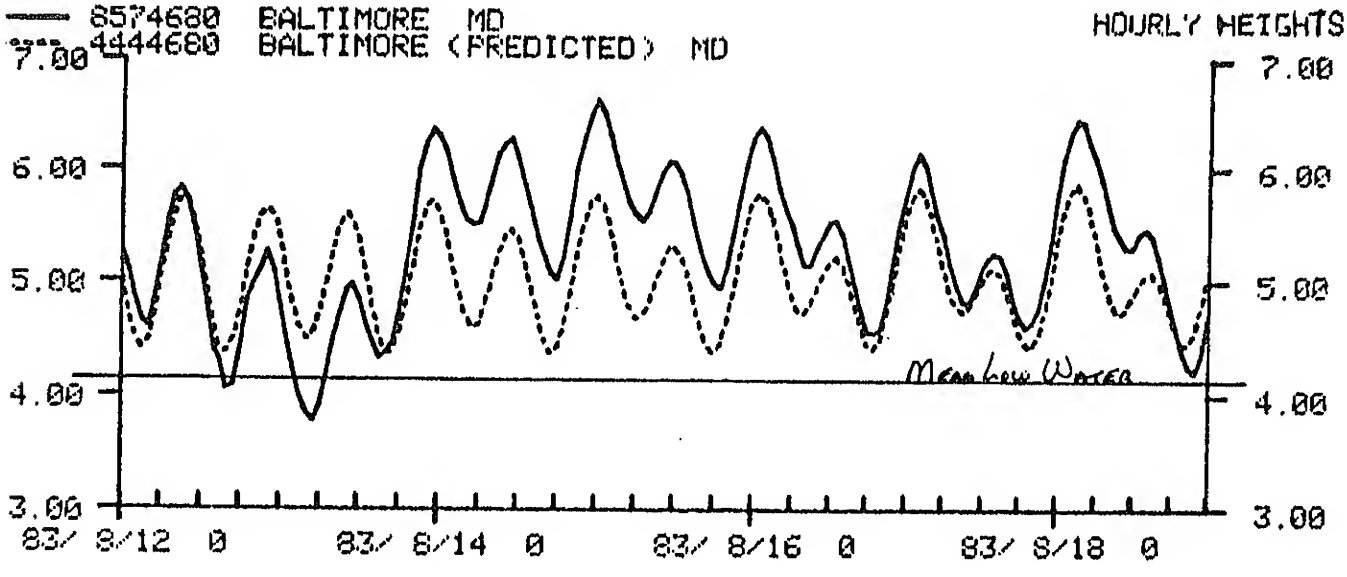
TIDES, MONTHLY MEAN SUMMARIES
Office of Oceanography and Marine Services

Issuance: Annually, following processing of 12 months of tide data for each station in the National Tide Observation Network (NTON).

Users: Waterborne commerce, port authorities, marinas, coastal industries, marine engineering and construction firms, academia, State and Federal agencies, and foreign governments.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Tides, Monthly Mean Summaries are records of the average monthly and yearly water level height. These include monthly and yearly averages for mean tide level, mean sea level, diurnal tide level, mean higher high water, mean high water, mean low water, mean lower low water, mean range, diurnal mean range, Greenwich mean high water time intervals, and Greenwich mean low water time intervals. Summary tide records are maintained for approximately 200 past and present stations in the National Tide Observation Network (NTON).



TIDAL BENCH MARK SHEETS WITH TIDAL DATUMS

Office of Oceanography and Marine Services

Issuance: As requested.

Users: Federal, State, and local agencies, engineering and survey firms, marine construction firms, insurance companies, dredging and salvaging companies, academia, waterborne commerce, and foreign government.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Tidal Bench Mark Sheets with Tidal Datums include identification number, name, State, and geographic position of the station; description and elevation of each bench mark referred to chart datum; summary of additional tidal datums referenced to the area's charted datum; number and period of tidal series, which is the basis of elevation information; relationship of National Geodetic Vertical Datum of 1929 to charted datum for stations connected to the National Geodetic Network; highest and lowest water levels observed or estimated to be the nearest half foot above or below charted datum; and datums computed from 19-year tide observations and short-term equivalents for the National Tidal Datum Epoch presently in use. Tide data are on file for 3,500 tide stations along the U.S. coasts, and data for approximately 200 new stations are added to the file each year. An index of the stations is available.

FREQUENCY AND DURATION ANALYSIS OF TIDAL WATERS

Office of Oceanography and Marine Services

Issuance: As requested.

Users: These data, originally developed for use by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers in quantifying the definition and classification of wetlands and for use in issuing permit applications, are now also used by Federal and State agencies, private engineering and construction firms, and the courts.

For orders and information, write or call: Ocean Requirments and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Frequency and Duration of Tidal Inundations is a summary report of a detailed statistical analysis of historic records of tide action at NOS tide stations. This analysis may be performed relative to either high or low waters. The report shows the frequency and duration of inundation of every 10th foot of elevation over a period of years. Results of the analysis are reported in five tabular columns: (1) elevations above station datum in feet and meters at increments of every 10th of a foot over the total range of water level at the station; (2) frequency of inundation—the number of times the water level has equaled or exceeded each incremental elevation for a period of the analysis; (3) percent frequency of inundation—the number of inundations in item 2, expressed as a percentage of the total number of inundations occurring in the period of the analysis; (4) duration of inundation—the total hours at which the water level remained at or exceeded each incremental height for the period of the analysis; and (5) percent duration of inundation—the number of hours in item 4, expressed as a percentage of the total number of hours in the period of the analysis. This new service was started in 1979, involving the analysis of long term tide data for each NOS tide station. Reports are added to the station data file as they are completed.

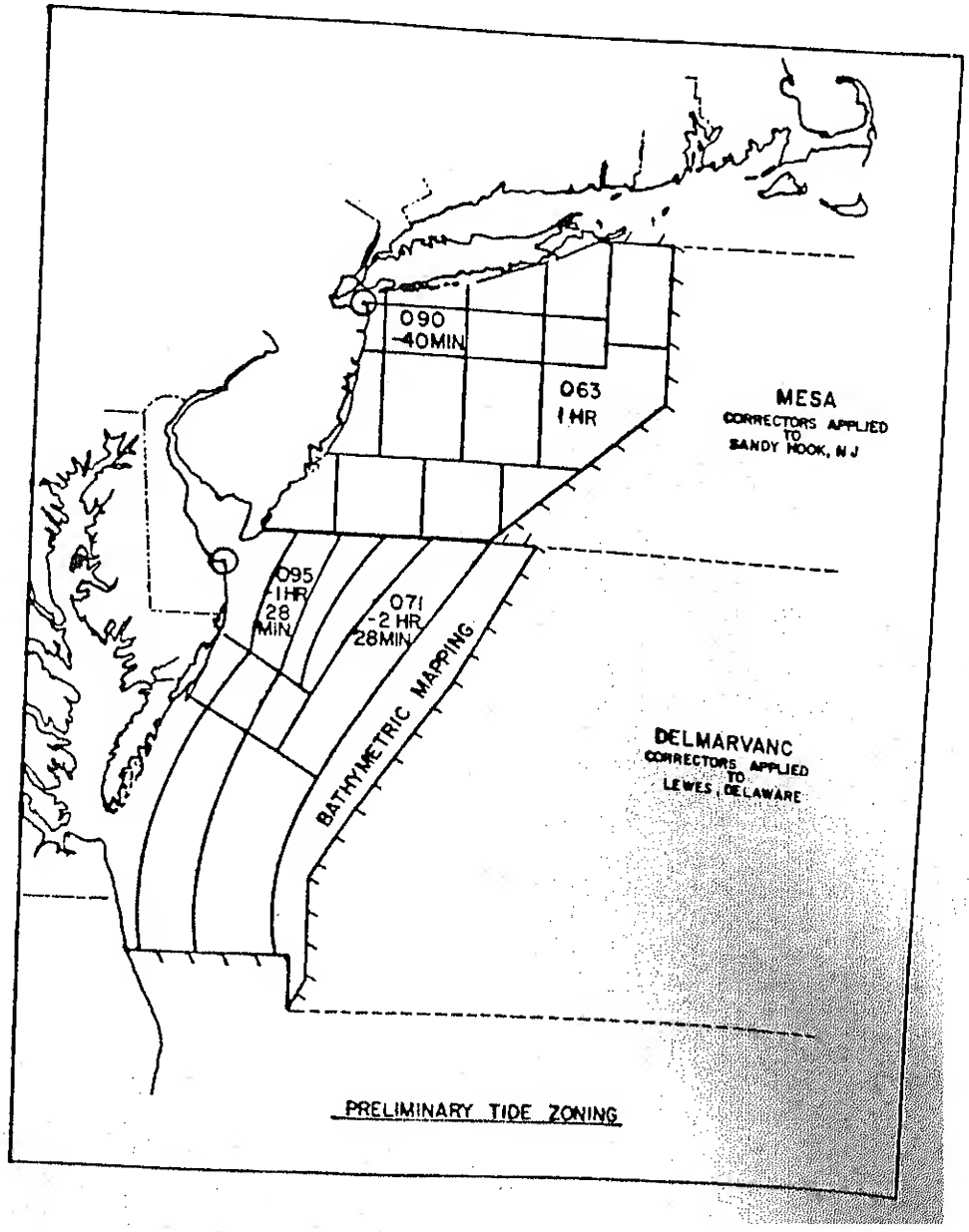
TIDAL ZONING
(AREA PREDICTION FACTORS)
Office of Oceanography and Marine Services

Issuance: As requested.

Users: Federal and private hydrographic surveys, marine research, offshore oil and gas operations, dredging and ocean mining, and modeling of global tides.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Tidal Zoning (Area Tide Prediction Factors) is a new category of tide data that provides the tidal corrections for predicting height and time over large areas of United States and Caribbean coastal and Continental Shelf waters. These corrections when applied to the tide predictions for a control tide station determine the predicted time and height of the tides over the area. These computations are based on tide behavior at tide station locations and are prepared by NOS on request.



TIDE STATION OCEAN TEMPERATURE AND DENSITY

Office of Oceanography and Marine Services

Issuance: Monthly, following processing of observed temperature and density data for each station; all tide station data are processed in monthly increments and added to the station data file.

Users: Federal and State agencies, private research organizations, academia, marine engineering and construction firms, and commercial fisheries.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Tide Station Ocean Temperature and Density is a daily tabulation of data for observation time; outdoor temperature; seawater temperature; observed density; reduced density; computed salinity; maximum, mean, and minimum values for air temperature, seawater temperature, density, and salinity; and station identification. Monthly records are on file for approximately 72 selected primary tide stations, dating back to 1834 for some stations. Annual summaries and an index of stations are also available.

TABULATION OF MONTHLY SEA SURFACE TEMPERATURES AND DENSITIES — NOAA/NATIONAL OCEAN SURVEY ROCKVILLE, MD.

STATION: LEWES,DEL. STATION NUMBER: 8557380 LATITUDE/LONGITUDE: 38 46.9N 75 07.2W DATE: MAY 81

DAY	TIME (24 HR)	OUTDOOR AIR TEMPERATURE (DEGREES F)	SEAWATER TEMPERATURE (DEGREES F)	JAR WATER TEMPERATURE (DEGREES F)	OBSERVED DENSITY	REDUCED DENSITY (59 F)	COMPUTED SALINITY (PPT)	DATA CHECKS AIR	SEA	JAR	DENS
01	1734	55.0	57.5	58.5	1.0242	1.0242	32.8				
02											
03											
04	1511	71.0	58.5	59.0	1.0240	1.0240	32.4				
05	1631	70.0	58.5	59.0	1.0238	1.0238	32.1				
06	1620	61.0	59.0	60.5	1.0238	1.0240	32.4				
07											
08	1730	55.0	59.0	60.0	1.0240	1.0241	32.5				
09											
10											
11	0955	60.0	59.0	61.0	1.0242	1.0244	32.9				
12											
13	1723	64.0	60.0	60.5	1.0240	1.0242	32.8				
14	2011	60.0	60.0	61.0	1.0242	1.0244	32.9				
15	1830	63.0	60.5	61.0	1.0240	1.0242	32.8				
16											
17											
18	1811	60.0	60.5	61.5	1.0242	1.0245	33.1				
19	1449	63.0	60.5	61.0	1.0242	1.0244	32.9				
20	1524	65.0	61.0	61.5	1.0240	1.0243	32.8				
21	1453	69.0	61.0	61.5	1.0236	1.0239	32.5				
22	1053	73.0	61.5	62.5	1.0238	1.0242	32.8				
23											
24	1100	77.0	62.0	63.0	1.0236	1.0238	32.1				
25											
26	1025	64.0	62.5	63.0	1.0228	1.0232	31.4				
27	1148	62.0	62.5	63.5	1.0224	1.0230	31.1				
28											
29	1041	72.0	64.0	64.5	1.0220	1.0227	30.7				
30	1641	84.0	64.0	64.5	1.0222	1.0229	31.0				
31											

OCEANOGRAPHIC EXPERT CONSULTATION AND TIDAL SPECIAL SERVICES

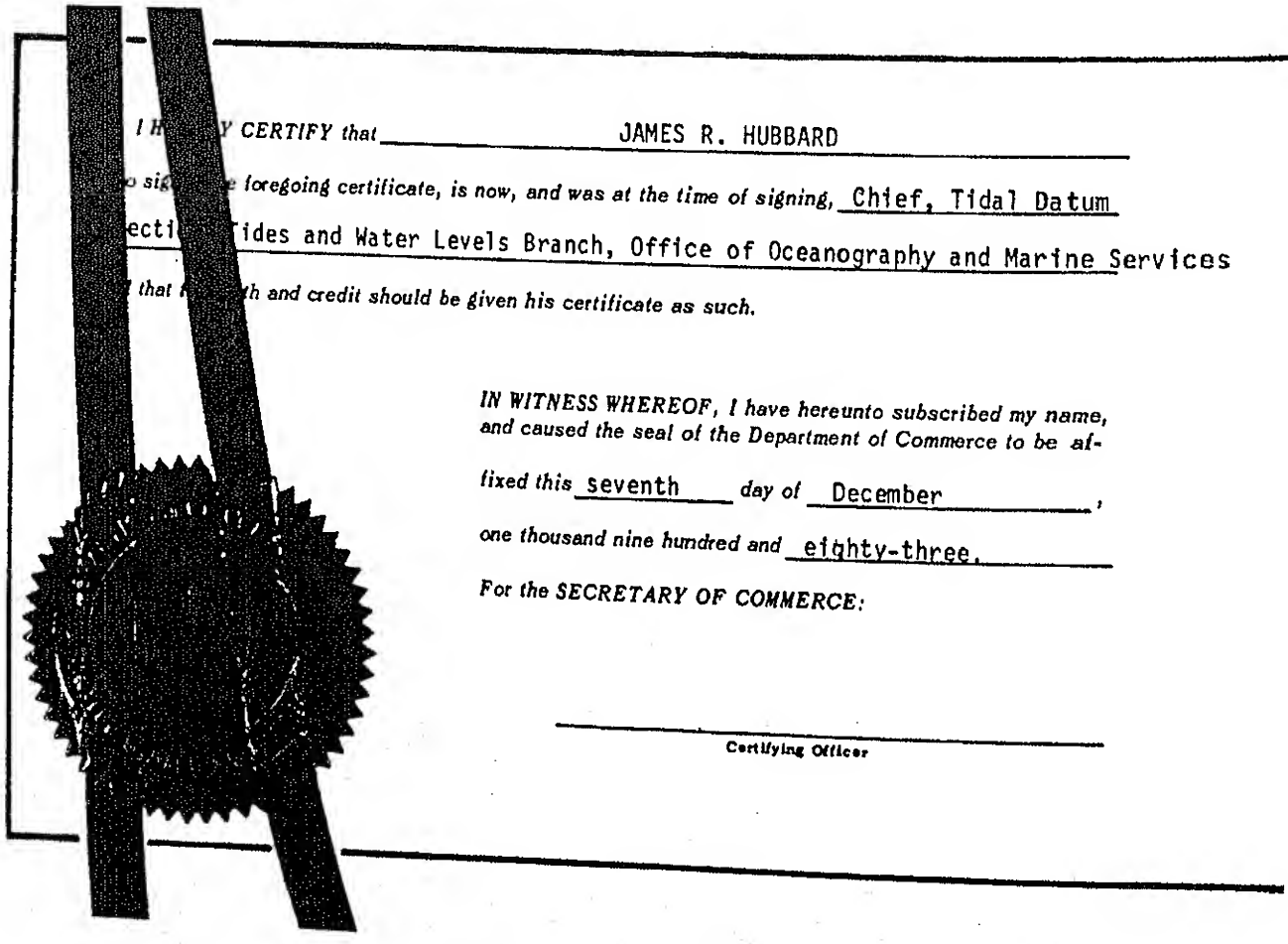
Office of Oceanography and Marine Services

Issuance: As requested.

Users: Federal, State, and local agencies, law firms, courts, and engineering survey firms.

For orders and information, write or call: Tidal Datum Section, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8467).

Oceanographic Expert Consultation is provided on a request basis. This includes the certification of observed and predicted tidal data for court evidence and legal documents. Expert witness testimony may be obtained in special cases after clearance through the Office of General Counsel. *Tidal special services* includes development of harmonic constants for prediction of tides, long-term tidal mean and extreme data analysis, and technical advice on methods for conducting tidal surveys.



I H[illegible]Y CERTIFY that JAMES R. HUBBARD

o sig[illegible]e foregoing certificate, is now, and was at the time of signing, Chief, Tidal Datum

ecti[illegible]ides and Water Levels Branch, Office of Oceanography and Marine Services

that [illegible]th and credit should be given his certificate as such.

IN WITNESS WHEREOF, I have hereunto subscribed my name, and caused the seal of the Department of Commerce to be affixed this seventh *day of* December,

one thousand nine hundred and eighty-three.

For the SECRETARY OF COMMERCE:

Certifying Officer

CIRCULATORY SURVEY DATA
Office of Oceanography and Marine Services

Issuance: As requested.

Users: Federal, State, and local agencies; marine engineering and transportation firms, academia, and waterborne commerce.

For orders and information, write or call: Office of Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8501).

Circulatory Survey Data include measurements of water currents, tides, temperature, and salinity structures; meteorological parameters; and other associated data, such as dissolved oxygen and waves. These data, available as computer printout or on magnetic tape, are available as: (1) processed and edited data; (2) harmonic and non-harmonic constants; (3) general, spectral and rotary current graphic plots; (4) tabulations of salinity, temperature, and density; and (5) cross-sectional and time-contouring of salinity, temperature, and density. These data may be used as input for oceanographic research and numerical hydrodynamic models and determinants and/or indicators for decisions and operations in the coastal zone, such as sewage disposal, pollution control, location and design of offshore structures, and shoreline erosion studies and control.

ESTUARINE AND COASTAL CIRCULATION DATA ANALYSIS

Office of Oceanography and Marine Services

Issuance: Varies, following processing and analysis of field survey data for an estuarine or coastal area.

Users: Federal and State agencies; engineering and construction firms; port authorities; research groups; and academia.

For information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8501).

Estuarine and Coastal Circu
performed on the field circulat
of which date back to 1844.
information on the current
most estuarine and coastal a
States from observation peri
several months. Data analysis
veys has been compiled into N
latory Survey Reports and/or N
Generally, the NOS Oceanogr
vey Reports provide a descripti
the employed instrumentation a
acquired data, the status of t
analysis, and examples of the
tent of the Technical Reports
complexity of the water body
author in emphasizing certain
The following Oceanographi
Reports are available: Tide a
servation from 1965 through 196
Block Island Sound, and Tri
Circulatory Survey 1963; Puget
culatory Survey; and Cook Inl
1973-75. Recent Technical Rep
dynamics in the Strait of Juan
gia; Circulation and Hydrodynam
Fear River, N.C.; and The Res
Hurricane Belle, August 1976.

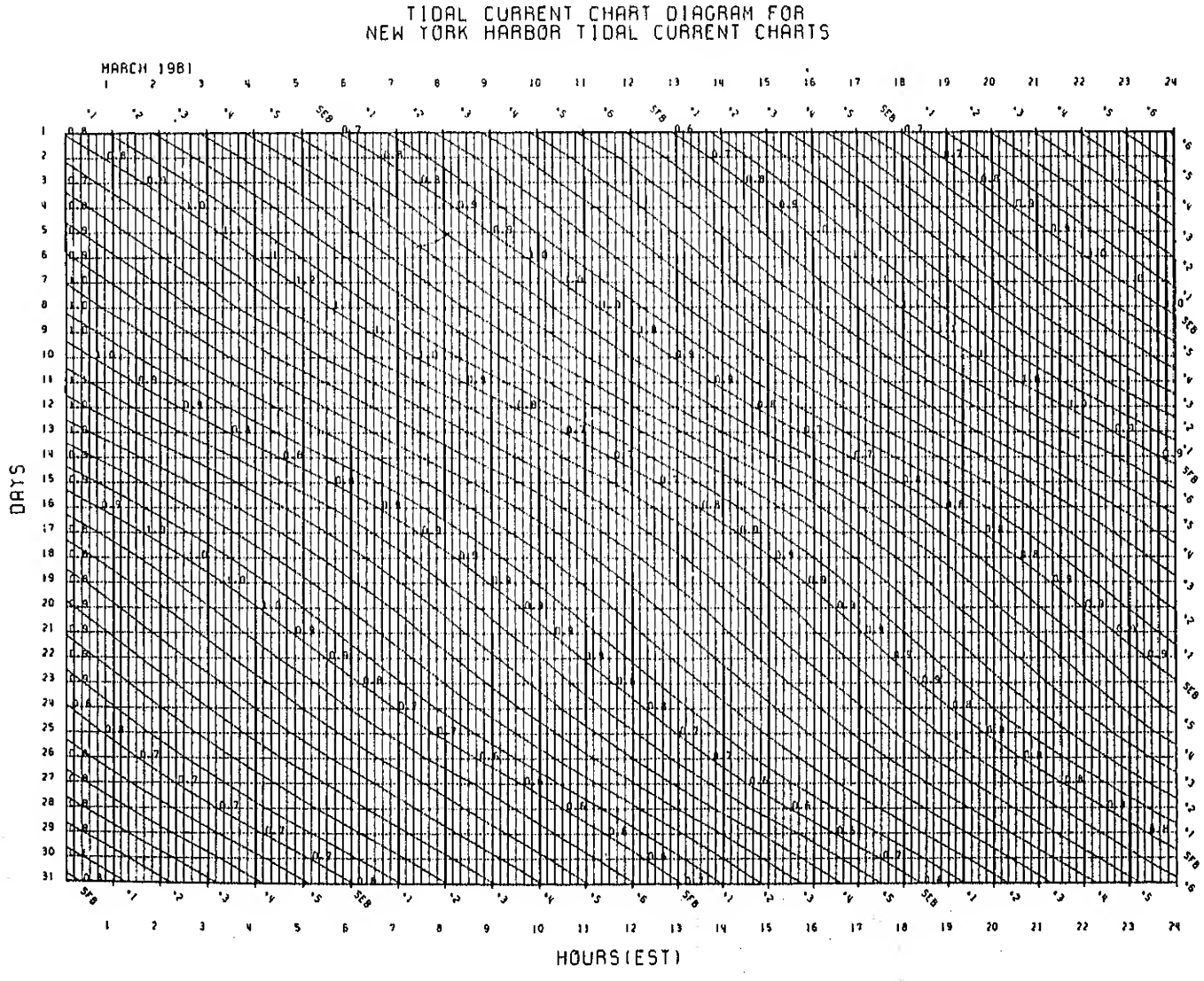
TIDAL CURRENT DIAGRAMS
Office of Oceanography and Marine Services

Issuance: Annually.

Users: Waterborne commerce, military, construction and engineering firms, and recreational boaters.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Tidal Current Diagrams, a series of 12 monthly diagrams with available coverage limited to selected areas, such as Long Island and Block Island Sound, Boston Harbor, Upper Chesapeake Bay, and New York Harbor, are used with corresponding *Tidal Current Charts* to facilitate the determination of tidal current predictions in the area. Each diagram represents graphically the predicted tidal current at the reference station for the area shown on the *Tidal Current Chart* and specifies which chart to use and what correction value to apply to the speeds shown on the chart to calculate the tidal current for a specific date and time.



Tidal Current Diagram for New York Harbor.

TELEMETERED WATER LEVEL DATA, GREAT LAKES

Office of Oceanography and Marine Services

Issuance: Biweekly or as requested.

Users: Federal and State agencies, Canadian Government, and construction and power companies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Telemetered Water Level Data, Great Lakes, is a compilation of provisional up-to-date telemetered water level data, hourly values, and daily mean in feet received from 23 key stations located around the Great Lakes. The elevations are referred to the International Great Lakes Datum (1955).

INTERROGATION OF TELEMETER GAGE:

1982 HOURLY ELEVATIONS AND DAILY MEANS IN FEET, IGLD(1955)

Gage no. 5014: Harbor Beach, Michigan on Lake Huron
Gage constant is 587.26 ft.

Hour	10 Sep	11 Sep	12 Sep	13 Sep	14 Sep	15 Sep
0100		578.73	578.80	578.74	578.70	578.92
0200		578.74	578.78	578.73	578.73	578.98
0300		578.72	578.82	578.72	578.73	578.89
0400		578.73	578.80	578.69	578.82	578.84
0500		578.70	578.77	578.71	578.81	578.83
0600		578.74	578.79	578.67	578.78	578.78
0700		578.72	578.77	578.71	578.74	578.81
0800		578.75	578.81	578.75	578.78	578.81
0900	578.86	578.74	578.79	578.74	578.83	578.82
1000	578.85	578.73	578.84	578.77	578.90	578.88
1100	578.91	578.76	578.78	578.71	578.85	578.77
1200	578.87	578.76	578.85	578.75	578.97	578.84
1300	578.90	578.77	578.82	578.65	578.94	578.69
1400	578.86	578.78	578.80	578.73	578.99	578.65
1500	578.85	578.77	578.82	578.74	578.94	578.68
1600	578.86	578.79	578.79	578.76	579.01	578.79
1700	578.82	578.82	578.77	578.77	578.99	
1800	578.84	578.85	578.80	578.73	579.02	
1900	578.80	578.82	578.80	578.76	579.02	
2000	578.77	578.80	578.77	578.72	579.02	
2100			578.83	578.73	579.05	
			578.77	578.74	579.02	
			578.77	578.72	579.12	
			578.80	578.79	578.99	
			578.80	578.73	578.91	578.81

s zero

ıgs: 578.88 ft.

ıe
ıot in consecutive readings

HOURLY WATER LEVELS, GREAT LAKES
Office of Oceanography and Marine Services

Issuance: Monthly or as requested.

Users: Federal and State agencies, the Canadian Government, and construction and power companies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Hourly Water Levels, Great Lakes, is a tabulation of hourly water level data in feet for each of 54 gages located around the Great Lakes. The data include the mean water level elevation in feet for each day of the month at a gage, the mean value for the month, and the maximum and minimum levels for the month. The elevations are referred to the International Great Lakes Datum (1955). Monthly records are on file for each water level gage, with some records dating back to 1960. Furthermore, annual summaries and an index of stations are available.

U.S. Department of Commerce — DECEMBER 1981
NOAA, NOS Rockville, Maryland | WATER LEVELS IN FEET |
Great Lakes Water Levels, C234 | IGLD (1955) |

Station 9018 : D1,#8
Marquette Coast Guard, Marquette, Michigan on Lake Superior

EST	17	18	19	20	21	22	23	24
0100	600.22	600.35	600.39	600.15	599.89	600.04	600.12	600.03
0200	600.21	600.43	600.29	600.14	599.93	600.04	600.15	599.94
0300	600.28	600.43	600.30	600.16	599.97	599.99	600.10	600.03
0400	600.32	600.48	600.32	600.09	599.90	600.00	600.19	600.06
0500	600.23	600.40	600.21	600.06	599.95	600.03	599.90	600.07
0600	600.25	600.40	600.26	600.06	599.94	600.08	600.19	600.10
0700	600.25	600.31	600.19	600.01	599.97	600.13	600.20	600.13
0800	600.27	600.33	600.29	600.12	600.03	600.07	600.02	600.06
0900	600.33	600.39	600.27	600.01	600.01	600.10	600.05	600.02
1000	600.31	600.37	600.26	600.12	600.08	600.04	599.99	600.02
1100	600.29	600.36	600.23	600.05	599.97	600.05	600.03	600.00
1200	600.31	600.42	600.21	599.98	600.03	600.04	600.09	600.07
1300	600.27	600.40	600.20	599.99	600.03	600.05	600.04	600.02
1400	600.25	600.36	600.21	600.01	600.04	600.14	600.03	600.14
1500	600.27	600.36	600.17	599.97	600.05	600.12	600.04	600.03
1600	600.29	600.27	600.14	599.96	600.06	600.16	600.05	600.05
1700	600.29	600.33	600.28	600.00	600.06	600.18	600.05	600.10
1800	600.35	600.37	600.14	599.87	599.98	600.11	600.05	599.92
1900	600.40	600.43	600.18	599.93	600.08	600.12	600.03	600.10
2000	600.44	600.37	600.18	599.87	600.08	600.01	600.01	600.07
2100	600.44	600.32	600.13	599.91	600.12	600.09	600.01	600.19
2200	600.40	600.31	600.10	599.99	600.13	600.12	600.15	600.22
2300	600.30	600.32	600.10	599.94	600.11	600.13	599.95	600.12
2400	600.34	600.27	600.18	599.99	600.13	599.99	599.95	600.07
MEAN	600.30	600.37	600.22	600.02	600.02	600.08	600.06	600.06

EST	25	26	27	28	29	30	31	
0100	600.02	600.10	600.02	600.03	600.08	600.02	600.21	MONTHLY
0200	600.03	600.05	600.07	600.02	600.15	600.08	600.11	MAXIMUM
0300	599.97	600.10	600.10	600.06	600.13	600.02	600.08	600.61
0400	600.08	600.11	600.15	600.11	600.18	600.06	599.98	1300/01
0500	600.09	600.10	600.06	600.13	600.11	600.01	599.94	
0600	600.06	600.14	600.12	600.11	600.10	600.04	599.94	
0700	600.16	600.05	599.99	600.10	600.14	600.03	599.91	MONTHLY
0800	600.00	600.00	600.03	600.14	600.10	600.00	600.02	MINIMUM
0900	600.02	600.07	600.01	600.16	600.09	600.05	600.08	599.87
1000	600.02	600.02	600.07	600.19	600.11	600.01	600.11	1800/30
1100	600.14	600.10	600.12	600.19	600.15	600.10	600.06	
1200	600.26	600.14	600.07	600.19	600.10	600.01	600.10	
1300	600.18	600.10	600.13	600.16	600.06	600.08	599.98	MONTHLY
1400	600.26	600.11	600.06	600.15	600.09	600.11	600.25	MEAN
1500	600.19	600.06	600.08	600.17	600.10	599.92	600.19	600.21
1600	600.04	599.99	600.05	600.12	600.05	600.07	600.12	
1700	600.06	599.93	600.00	600.15	600.08	599.98	600.26	
1800	600.01	600.04	600.07	600.04	600.09	599.87	600.17	
1900	600.15	600.08	600.06	600.17	600.06	599.96	600.36	
2000	600.13	600.06	600.09	600.19	600.08	599.94	600.23	P =
2100	600.28	600.16	600.09	600.17	600.06	600.05	600.42	partial
2200	600.22	600.08	600.04	600.17	600.08	599.94	600.41	record
2300	600.10	600.13	599.98	600.21	600.11	599.93	600.33	
2400	600.10	600.03	600.00	600.12	600.10	600.11	600.39	
MEAN	600.11	600.07	600.06	600.14	600.10	600.02	600.15	

DAILY MEAN WATER LEVELS, GREAT LAKES

Office of Oceanography and Marine Services

Issuance: Monthly.

Users: Federal and State agencies, Canadian Government, and construction and power companies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Daily Mean Water Levels, Great Lakes, is a tabulation of daily average water level data in feet for each of 54 gages located around the Great Lakes. The elevations are referenced to the International Great Lakes Datum (1955). Records are on file for each water level gage, and a data summary sheet is available.

U.S. Department of Commerce
NOAA, NOS Rockville, Maryland
Great Lakes Water Levels, C234

1981 Daily Mean Water Levels
Water Levels in Feet, IGLD (1955)
D4,f2

Station 3020 : Buffalo Harbor, Buffalo, New York on Lake Erie

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	570.94	570.38	571.16	571.36	571.61	571.58	571.94	572.07	571.78	572.23	571.59	571.06
2	571.43	571.29	571.38	571.10	571.66	571.68	572.03	572.08	571.84	572.28	571.59	572.35
3	571.02	571.14	571.24	571.20	571.54	571.76	572.14	572.08	571.77	571.95	571.45	571.53
4	571.48	570.61	571.02	571.18	571.59	571.97	572.21	572.26	572.10	571.82	571.54	571.22
5	571.35	570.45	570.97	571.46	571.65	571.84	572.21	572.31	572.11	571.91	571.62	571.46
6	571.23	570.51	571.21	571.36	571.54	572.05	572.25	571.99	571.91	572.80	572.56	571.40
7	571.51	570.36	571.33	571.07	571.57	571.93	572.32	572.00	571.95	572.82	572.01	571.57
8	570.81	570.64	571.17	571.06	571.50	571.90	572.35	572.19	572.29	571.75	571.79	571.69
9	570.85	570.46	571.21	571.22	571.66	572.22	572.49	572.26	572.17	571.52	571.38	571.64
10	570.79	570.15	571.20	571.04	571.51	572.18	572.30	572.11	572.61	571.27	571.55	571.57
11	570.69	570.99	571.31	571.06	571.65	572.08	572.26	572.28	572.04	571.32	571.66	571.37
12	570.66	570.73	571.36	570.25	572.22	571.96	572.19	572.21	572.08	571.16	571.21	571.24
13	570.48	570.38	571.28	571.01	571.94	571.90	572.35	572.28	571.87	571.43	571.30	571.37
14	570.43	570.40	571.36	571.59	571.54	572.01	572.11	572.18	572.08	571.57	571.29	571.23
15	570.42	570.39	571.48	571.42	571.74	572.15	572.11	572.36	571.67	571.76	571.27	571.27
16	570.59	570.43	571.09	571.30	571.94	572.32	572.09	572.04	571.36	571.57	571.41	571.60
17	570.65	570.46	571.52	571.41	571.71	572.29	572.14	571.89	571.66	571.45	571.63	570.82
18	570.63	570.46	571.17	571.58	571.66	572.12	572.11	571.79	571.87	573.49	571.73	571.56
19	570.47	570.54	571.17	571.39	571.70	572.14	572.08	571.69	572.43	572.28	571.13	571.61
20	570.31	570.80	571.34	571.32	571.81	571.93	572.23	571.74	572.07	572.20	572.31	571.63
21	570.40	570.82	571.12	571.24	571.87	572.11	572.17	571.76	571.50	571.11	572.39	571.76
22	570.79	570.62	570.99	571.22	571.87	572.74	572.05	571.82	571.55	571.10	571.97	571.19
23	570.44	570.82	571.04	571.53	571.74	572.39	571.91	572.04	571.69	571.79	571.53	571.60
24	570.40	571.13	571.13	571.94	571.71	572.25	571.91	571.88	571.85	571.43	571.16	572.44
25	570.29	571.13	571.14	571.74	571.82	572.69	572.07	571.62	571.72	571.44	571.27	571.62
26	570.73	571.08	571.27	571.56	571.76	572.47	572.18	571.69	571.79	571.30	571.22	571.01
				571.53	571.61	572.24	572.13	571.61	572.54	571.36	572.91	571.92
				[illegible].38	571.74	572.20	572.16	571.62	572.29	571.45	572.02	571.24
				[illegible].83	571.79	572.27	572.17	571.76	571.66	571.27	571.59	571.60
30	570.38		571.30	571.67	571.83	572.13	572.13	571.89	571.43	571.37	571.22	571.50
31	570.31		571.09		571.91		572.00	571.82		571.48		571.10
MEAN	570.70	570.69	571.20	571.33	571.72	572.12	572.15	571.98	571.92	571.73	571.64	571.49
MAX.	572.25	572.56	572.26	572.70	572.74	574.57	573.14	573.54	573.87	575.74	575.72	574.46
	2000/04	1500/02	1000/17	1200/14	1300/12	1300/22	1600/26	0900/15	1700/19	1300/18	0500/27	1900/27
MIN.	570.08	569.77	570.57	569.61	571.00	571.40	571.56	571.19	570.34	570.50	569.68	569.99
	2400/31	1300/10	1000/05	1100/12	0400/11	1600/01	2400/21	0300/25	2200/21	0400/22	0400/20	0500/23

* Indicates Less than 90% of the Hourly Data Available.
/ Indicates No Data.

ANNUAL MEAN: 571.56

GREAT LAKES 7-DAY WATER LEVELS
Office of Oceanography and Marine Services

Issuance: Weekly.

Users: Federal and State agencies, the Canadian Government, and power companies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Great Lakes 7-Day Water Levels is a tabulation of the latest 7-day daily average water level data in feet and meters for 13 selected gages in the Great Lakes. Records are available back to 1969.

U.S. Department of Commerce
NOAA/NOS Rockville, Maryland
Great Lakes Water Levels, C234

GREAT LAKES 7 DAY WATER LEVELS
DAILY MEANS IN METERS (IGLD-1955)

	SUPERIOR			MICHIGAN-HURON			
1981	Duluth	Marq	Pt Iro	Har Bh	Luding	Milwau	Mack C
Dec 21	182.92	182.89	182.87	176.31	176.38	176.30	176.42
Dec 22	182.95	182.90	182.88	176.34	176.39	176.37	176.34
Dec 23	182.89	182.90	182.90	176.34	176.41	176.32	176.36
Dec 24	182.89	182.90	182.95	176.37	176.32	176.23	176.38
Dec 25	182.94	182.91	182.92	176.38	176.32	176.30	176.31
Dec 26	183.01	182.90	182.82	176.31	176.39	176.41	176.32
Dec 27	182.93	182.90	182.84	176.24	176.47	176.41	176.35
Mean	182.93	182.90	182.89	176.33	176.38	176.33	176.36
LWD	182.9	182.9	182.9	175.8	175.8	175.8	175.8

	ST CLAIR	ERIE			ONTARIO	
1981	St C S	Toledo	Cleve	Buff	Roches	Oswego
Dec 21	175.01	173.94	173.99	174.27	74.44	74.42
Dec 22	175.03	174.15	174.10	174.09	74.45	74.43
Dec 23	175.04	174.04	174.15	174.22	74.47	74.47
Dec 24	175.04	173.79	174.04	174.47	74.45	74.48
Dec 25	175.06	174.06	174.10	174.22	74.45	74.45
Dec 26	175.08	174.24	174.16	174.04	74.45	74.43
Dec 27	175.06	173.95	174.08	174.32	74.43	74.41
Mean	175.05	174.02	174.09	174.24	74.45	74.44
LWD	174.2	173.3	173.3	173.3	74.0	74.0

Provisional Data

HYDROGRAPH OF MONTHLY MEAN LEVELS OF THE GREAT LAKES

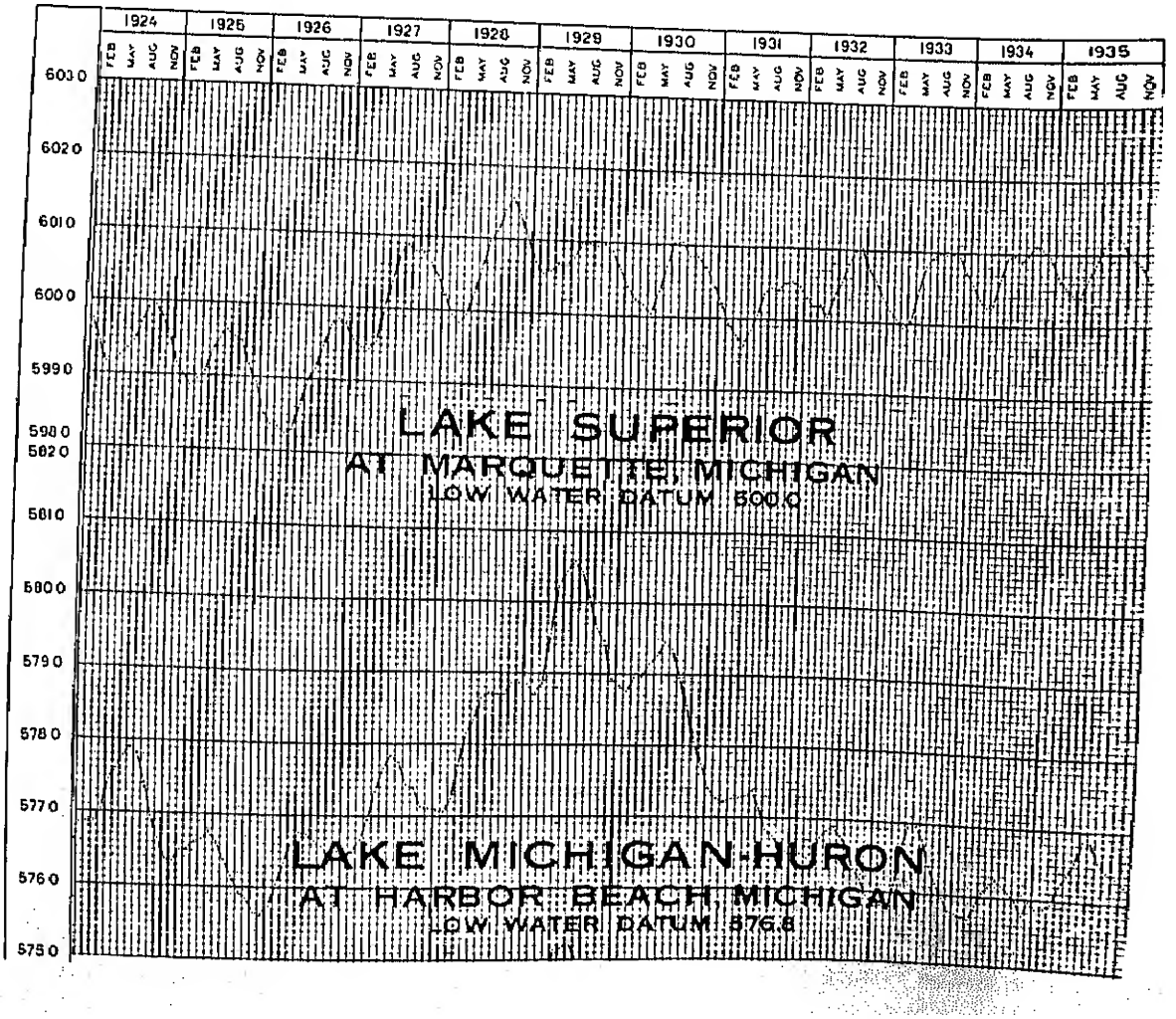
Office of Oceanography and Marine Services

Issuance: Annually.

Users: Federal and State agencies and the Canadian Government.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Hydrograph of Monthly Mean Levels of the Gre Lakes is a graphic depiction of monthly mean leve in feet for each of the Great Lakes and Lake St. Cl since 1900, with low water datums shown. All elev tions are referred to the International Great Lak Datum (1955).



GREAT LAKES DATA: MONTHLY MEAN ELEVATIONS AND MONTHLY MEAN DISCHARGE

Office of Oceanography and Marine Services

Issuance: Monthly.

Users: Federal and State agencies, the Canadian Government, and power companies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Great Lakes Data: Monthly Mean Elevations and Monthly Mean Discharge is a compilation of recorded monthly mean lake elevations in feet and monthly mean discharge in cubic feet per second of the major rivers connecting the Great Lakes. NOAA compiles the monthly elevation data, and the U.S. Army Corps of Engineers compiles the discharge data.

U.S. DEPARTMENT OF COMMERCE
NOAA-NATIONAL OCEAN SURVEY
ROCKVILLE, MARYLAND

G R E A T L A K E S D A T A

October 1979 Monthly Mean Elevations	IGLD (1955)*
Lake Superior at Marquette	601.29
Lake Michigan-Huron at Harbor Beach	579.56
Lake St. Clair at St. Clair Shores	574.72
Lake Erie at Cleveland	571.68
Lake Ontario at Oswego	244.75

*Elevations are in feet above mean water level at Father Point, Quebec, International Great Lakes Datum (1955).

October 1979 Monthly Mean Discharge in Cubic Feet Per Second **	
St. Marys River	97,000
St. Clair River	210,000
Detroit River	214,000
Niagara River	228,000
St. Lawrence River	292.000

** Provisional Data furnished by U. S. Army Corps of Engineers

MONTHLY PRECIPITATION SUMMARY, GREAT LAKES BASIN

Office of Oceanography and Marine Services

Issuance: Monthly.

Users: Federal and State agencies and the Canadian Government.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Monthly Precipitation Summary, Great Lakes Basin, lists the data for actual and normal precipitation in inches for the land, lake, and lake basin area for each of the Great Lakes, the amount of departure from normal, and the maximum and minimum historical values.

MONTHLY PRECIPITATION SUMMARY ~~~~~~~~~~ GREAT LAKES BASIN
SEPTEMBER, 1979

		MONTHLY PRECIPITATION						YEARLY PRECIPITATION TOTAL (Jan to Sep)				
		Sep '79 precip.	P/R Sep normal precip.	Departure from normal		Sep P/R extremes MAX.	MIN.	1979 actual	P/R normal	Departure from normal		
LAKE SUPERIOR	LAND	2.48"	3.41"	-0.93"	-27%	6.61"	1.37"	25.66"	22.64"	+3.02"	+13%	LAKE SUPERIOR
	LAKE	2.47"	3.49"	-1.02"	-29%	in	in	29.46"	23.18"	+6.27"	+27%	
	BASIN	2.47"	3.44"	-0.97"	-28%	1941	1948	27.15"	22.84"	+4.31"	+19%	
LAKE MICHIGAN	LAND	0.73"	3.45"	-2.66"	-77%	7.08"	0.73"	25.16"	24.80"	+0.36"	+1%	LAKE MICHIGAN
	LAKE	0.61"	3.35"	-2.74"	-82%	in	in	24.45"	23.70"	+0.75"	+3%	
	BASIN	0.73"	3.42"	-2.69"	-79%	1952	1979	24.94"	24.43"	+0.51"	+2%	
LAKE HURON	LAND	1.48"	3.30"	-1.82"	-55%	5.55"	1.10"	25.62"	23.36"	+2.26"	+10%	LAKE HURON
	LAKE	1.33"	3.09"	-1.76"	-57%	in	in	24.62"	22.99"	+1.63"	+7%	
	BASIN	1.43"	3.23"	-1.80"	-56%	1970	1948	25.29"	23.24"	+2.05"	+9%	
LAKE ERIE	LAND	2.49"	3.00"	-0.51"	-17%	6.93"	0.77"	27.93"	26.31"	+1.62"	+6%	LAKE ERIE
	LAKE	3.34"	3.04"	+0.30"	+30%	in	in	29.78"	25.88"	+3.90"	+15%	
	BASIN	2.87"	3.01"	-0.14"	-5%	1926	1908	28.41"	26.18"	+2.23"	+9%	
LAKE ONTARIO	LAND	4.16"	3.13"	+1.03"	+33%	6.52"	0.99"	28.55"	26.28"	+2.27"	+9%	LAKE ONTARIO
	LAKE	4.06"	2.86"	+1.20"	+42%	in	in	25.39"	24.40"	+0.99"	+4%	
	BASIN	4.14"	3.07"	+1.07"	+35%	1977	1964	27.87"	25.88"	+1.99"	+8%	
GREAT LAKES BASIN		2.07"	3.27"	-1.20"	-37%	5.41" in 1977	1.60" in 1948	26.44"	24.13"	+2.31"	+10%	

Note: P/R indicates Period of Record: January 1900 to present.

MONTHLY MEAN FLOW DIVERSIONS, GREAT LAKES

Office of Oceanography and Marine Services

Issuance: Annually.

Users: Federal and State agencies, the Canadian Government, and power companies.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Monthly Mean Flow Diversions, Great Lakes, is the compilation of the data for the average amount of water diverted in hundreds of cubic feet per second from the Great Lakes at major channels. Most of this water is returned to the Great Lakes Basin; however, some of it flows outside the basin. Daily records, which record the 19 diversions, are available, together with monthly summaries. Some of these records date back to 1952.

U.S. DEPARTMENT OF COMMERCE
NOAA - NATIONAL OCEAN SURVEY

COMPILED BY: WATER LEVELS BRANCH, C234
ROCKVILLE, MARYLAND

MONTHLY MEAN DIVERSIONS

IN THE GREAT LAKES SYSTEM ABOVE CORNWALL, ONTARIO

(HUNDREDS OF CUBIC FEET PER SECOND)

DIVERSIONS - 1978	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
FROM: Hudson Bay Basin TO: Lake Superior Basin												
Ogoki Diversion	33	27	23	22	41	97	92	67	62	50	38	28
Long Lake Diversion	20	17	12	9	6	27	18	14	8	6	3	13
FROM: St. Marys River TO: St. Marys River												
Canadian Powerhouse	167	179	182	187	176	172	166	162	171	173	178	172
E. S. Company Canal	282	282	275	277	287	292	298	295	296	292	287	281
United States Powerhouse	125	125	126	119	127	128	128	128	128	127	127	128
Navigation Canals	8	8	8	5	9	11	13	13	11	9	8	6
FROM: Lake Michigan Basin TO: Mississippi River Basin												
Metro Sanitary District Chicago	4	7	16	25	17	17	30	15	19	8	2	5
Chicago Area Domestic Pumpage	15	15	15	15	16	19	18	18	18	16	15	15
FROM: Lake Erie TO: Lake Ontario												
Welland Canal	8	10	9	18	26	25	26	22	20	20	20	17
DeCew Falls Powerhouse	65	65	71	57	50	49	47	55	68	68	64	68

GREAT LAKES WATER LEVELS—ANNUAL SUMMARY

Office of Oceanography and Marine Services

Issuance: Annually.

Users: Federal and State agencies, the Canadian Government, and construction and power companies.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Great Lakes Water Levels—Annual Summary contains Great Lakes water level gage records in both feet and meters. This publication shows, in tabular form for the calendar year, daily and monthly average levels for each gage in the network, the highest and lowest daily average level for each month, and a frequency distribution of daily average levels showing the number of times each month the recorded levels were at, or above, specific elevations. The locations of the recording water level gages are shown; an index lists the gage locations, identification numbers, and geographic coordinates.

U. S. DEPARTMENT OF COMMERCE
NOAA - NOS ROCKVILLE, MARYLAND
GREAT LAKES WATER LEVELS, C3314

MONTHLY AND ANNUAL AVERAGE ELEVATIONS
WATER LEVELS IN FEET, IGLD (1955)

Station 3063 : Cleveland, Ohio on Lake Erie

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL AVG
1920	569.36	568.84	568.92	569.69	570.36	570.55	570.69	570.68	570.45	570.15	570.00	569.99	569.97
1921	570.00	569.94	570.17	570.85	571.14	571.06	570.81	570.53	570.22	569.80	569.85	569.79	570.36
1922	569.56	569.22	569.44	570.37	570.78	570.81	570.78	570.54	570.36	569.94	569.48	569.17	570.05
1923	569.22	568.83	569.06	569.55	569.88	570.06	570.05	569.75	569.57	569.29	569.02	569.31	569.47
1924	569.33	569.37	569.28	569.83	570.21	570.35	570.49	570.20	570.00	569.75	569.11	568.83	569.73
1925	568.67	568.55	568.98	569.37	569.36	569.23	569.17	569.13	568.98	568.65	568.50	568.44	568.92
1926	568.10	567.96	568.08	568.86	569.28	569.23	569.25	569.35	569.48	569.76	569.52	569.51	569.03
1927	569.16	569.04	569.17	569.80	570.00	570.24	570.21	570.05	569.66	569.36	569.15	569.67	569.63
1928	569.72	569.73	569.51	569.85	570.13	570.45	570.73	570.64	570.20	569.91	569.73	569.86	570.05
1929	569.89	570.12	570.58	571.67	572.33	572.33	572.21	571.84	571.45	571.00	570.83	570.82	571.26
1930	571.42	571.27	571.63	572.02	572.00	571.73	571.54	571.08	570.63	570.30	569.85	569.71	571.11
1931	569.46	569.16	568.85	569.20	569.52	569.63	569.75	569.53	569.30	569.01	568.77	568.76	569.26
1932	569.26	569.55	569.51	569.65	569.90	569.82	569.80	569.55	569.26	568.70	568.60	568.44	569.35
1933	568.73	568.66	568.98	569.73	570.17	570.10	569.83	569.54	569.09	568.65	568.23	568.18	569.16
1934	568.01	567.68	567.65	568.20	568.43	568.46	568.46	568.36	568.23	567.95	567.60	567.53	568.05
1935	567.62	567.56	567.88	568.31	568.65	568.81	568.93	568.95	568.58	568.17	568.09	568.07	568.30
1936	567.67	567.43	568.20	568.95	569.24	569.25	569.17	568.90	568.71	568.57	568.33	568.15	568.55
1937	568.79	569.33	569.33	569.68	570.26	570.44	570.67	570.44	569.87	569.30	568.88	568.60	569.63
1938	568.62	569.06	569.50	570.16	570.23	570.35	570.35	570.34	569.97	569.67	569.23	569.06	569.71
1939	569.03	569.02	569.45	570.02	570.41	570.45	570.33	570.24	569.91	569.52	569.29	569.10	569.74
1940	568.71	568.67	568.84	569.54	569.96	570.29	570.34	570.14	570.01	569.71	569.30	569.42	569.58
1941	569.75	569.33	569.15	569.38	569.53	569.63	569.65	569.45	569.12	568.84	568.56	568.62	569.26
1942	568.47	568.76	568.95	569.93	570.24	570.61	570.59	570.52	570.27	570.02	569.89	569.78	569.84
1943	570.18	569.89	570.10	570.63	571.43	572.13	572.13	571.88	571.43	571.08	570.77	570.41	571.01
1944	569.99	569.85	569.98	570.82	571.35	571.50	571.29	570.94	570.64	570.35	570.11	569.88	570.56
1945	569.71	569.45	570.13	570.82	571.22	571.66	571.79	571.55	571.21	571.32	570.94	570.69	570.87
1946	570.65	570.28	570.60	570.81	570.94	571.44	571.53	571.16	570.73	570.35	570.04	569.74	570.69
1947	569.66	569.67	569.64	570.87	571.82	572.33	572.14	571.90	571.64	571.11	570.72	570.50	571.00
1948	570.45	570.21	570.73	571.50	571.92	571.95	571.84	571.50	571.08	570.50	570.16	570.00	570.99
1949	570.06	570.32	570.51	570.65	570.77	570.75	570.66	570.36	569.90	569.64	569.19	569.06	570.16

GREAT LAKES ANNUAL MAXIMUM AND MINIMUM LEVELS

Office of Oceanography and Marine Services

Issuance: Annually, following processing of 12 months of observed Great Lakes water level data.

Users: Federal and State agencies, the Canadian Government, port authorities and marinas, shoreline industries, marine engineering and construction firms, and utility and power generating stations, and waterborne commerce.

For information and orders, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Great Lakes Annual Maximum and Minimum Levels provide compilations of the historic tabulation of water level elevations during stages of highest and lowest water levels for each year at each of 54 water level gages located around the five Great Lakes. The maximum stage data include the month of highest level and the mean elevation for that month, the day of the month with the highest level and mean elevation for that day, and the day and elevation of the highest hourly level during the year; the minimum stage data include the same information but for the lowest levels. The monthly records on file are available for the 54 Great Lakes observation stations, with some records dating back to 1901. Annual summaries and an index of the stations are available.

U. S. DEPARTMENT OF COMMERCE
NOAA - NOS ROCKVILLE, MARYLAND
GREAT LAKES WATER LEVELS, C3314

MAXIMUM AND MINIMUM ELEVATIONS
WATER LEVELS IN FEET, IGLD (1955)

Station 9016 : Marquette, Michigan on Lake Superior

	MAXIMUM STAGES						MINIMUM STAGES					
YEAR	MONTHLY MEAN		DAILY MEAN		INSTANTANEOUS		MONTHLY MEAN		DAILY MEAN		INSTANTANEOUS	
1960	JUL	601.07	30 JUL	601.16	1 SEP	602.29	MAR	600.01	11 APR	599.78	23 APR	598.78
1961	OCT	600.57	11 SEP	600.74	30 AUG	602.05	MAR	599.75	26 MAR	599.61	6 MAR	599.05
1962	SEP	600.76	19 SEP	600.92	13 SEP	601.62	MAR	599.62	24 FEB	599.48	23 MAY	598.75
1963	AUG	600.70	12 SEP	600.87	27 SEP	601.47	MAR	599.55	15 MAR	599.46	8 MAY	598.20
1964	SEP	600.99	9 OCT	601.26	7 SEP	602.39	APR	599.52	13 APR	599.29	26 JUN	598.62
1965	OCT	600.73	23 OCT	601.03	28 JUN	601.85	MAR	599.75	27 MAR	599.65	3 MAY	598.89
1966	AUG	601.00	15 OCT	601.13	17 JUL	602.53	MAR	600.07	8 MAR	599.87	18 MAR	599.23
1967	AUG	600.99	9 AUG	601.14	17 AUG	601.73	MAR	599.89	30 MAR	599.76	30 MAR	599.02
1968	SEP	601.82	28 OCT	602.02	2 OCT	602.38	MAR	599.68	14 MAR	599.49	28 MAR	599.10
1969	AUG	601.15	10 JAN	601.30	12 JUN	601.93	DEC	600.42	25 DEC	600.21	23 NOV	599.94
1970	NOV	601.41	23 NOV	601.79	6 FEB	602.68	APR	599.78	7 APR	599.64	19 APR	599.11
1971	AUG	601.57	22 AUG	601.65	18 JUN	602.28	MAR	600.69	16 FEB	600.51	29 JAN	600.19
1972	SEP	601.57	8 OCT	601.74	17 SEP	602.29	MAR	600.62	12 APR	600.51	17 APR	599.76
1973	AUG	601.91	6 SEP	602.07	27 SEP	602.51	FEB	600.47	27 FEB	600.29	14 MAR	600.03
1974	SEP	601.90	29 SEP	602.03	6 OCT	602.60	MAR	600.53	29 MAR	600.37	2 MAR	600.06
1975	JUL	601.54	25 JUL	601.63	20 MAY	602.12	APR	600.77	28 MAR	600.65	20 MAY	600.15
1976	JUL	601.37	13 AUG	601.47	11 AUG	602.02	DEC	600.08	24 DEC	599.92	11 DEC	599.46
1977	OCT	601.39	11 NOV	601.70	11 NOV	601.99	FEB	599.60	21 FEB	599.48	4 MAR	599.20
1978	SEP	601.20	6 OCT	601.39	11 SEP	602.00	APR	600.23	9 APR	600.08	10 APR	599.56
1979												

GREAT LAKES WATER LEVELS—1860-1980

Office of Oceanography and Marine Services

Issuance: Every 5 years.

Users: Federal and State agencies, the Canadian Government, and construction and power companies.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Great Lakes Water Levels—1860-1980 contains 258 pages of figures, a map and geographical index showing the network of over 50 permanent gages, and tabular records of monthly and annual average water surface elevations for each gage for the period of its existence, as well as tables showing summaries of average and extreme levels.

U. S. DEPARTMENT OF COMMERCE
NOAA - NOS ROCKVILLE, MARYLAND
GREAT LAKES WATER LEVELS, C3114

SUMMARY OF AVERAGE AND EXTREME LEVELS
WATER LEVELS IN FEET, IGLD (1955)

Station 3063 : Cleveland, Ohio on Lake Erie

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL AVG
# MONTHLY AVERAGE FOR PERIOD 1860 THRU 1975	569.93	569.89	570.11	570.64	570.97	571.1e	571.05	570.d>	570.61	570.26	570.02	569.96	570.46
MONTHLY AVERAGE FOR PERIOD 1900 THRU 1975	569.74	569.72	569.95	570.51	570.82	570.96	570.92	570.73	570.44	570.12	569.84	569.78	570.29
MONTHLY AVERAGE FOR PERIOD 1966 THRU 1975	570.87	571.04	571.30	571.70	571.91	572.04	572.02	571.82	571.53	571.16	570.89	571.13	571.46
HIGHEST MONTHLY AVERAGE FOR PERIOD 1860 THRU 1975													
LEVEL	572.93	572.53	572.88	573.30	573.25	573.51	573.34	573.07	572.51	572.14	572.17	572.35	572.71
YEAR	1973	1973	1973	1973	1973	1973	1973	1973	1973	1973	1972	1972	1973
LOWEST MONTHLY AVERAGE FOR PERIOD 1860 THRU 1975													
LEVEL	567.62	567.49	567.65	568.20	568.43	568.46	568.46	568.36	568.23	567.95	567.60	567.53	568.05
YEAR	1935	1936	1934	1934	1934	1934	1934	1934	1934	1934	1934	1934	1934

HIGHEST MONTHLY AVERAGE FOR PERIOD 1860 THRU 1975 ....573.51 JUN 1973

LOWEST MONTHLY AVERAGE FOR PERIOD 1860 THRU 1975 .....567.49 FEB 1936

BENCH MARK DESCRIPTIONS AND INTERNATIONAL GREAT LAKES DATUM ELEVATIONS

Office of Oceanography and Marine Services

Issuance: As requested.

Users: Federal and State agencies; Canadian Government, and construction and engineering firms.

For orders and information, write or call: Ocean Requirements and Data Analysis Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8443).

Bench Mark Descriptions and International Great Lakes Datum Elevations describe the locations for approximately 3,000 bench marks in the Great Lakes area, with published elevations on the International Great Lakes Datum (1955).

NEW YORK 906 3028

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

WATER LEVEL BENCH MARKS
INTERNATIONAL GREAT LAKES DATUM (1955)

Sturgeon Point (Lake Erie)
Lat. 42°41.5'; 79°02.8'

B.M. STURGEON, (1968), is at Sturgeon Point, Erie County, New York, approximately 1.9 miles west and northwest along Sturgeon Point Road from the intersection of Sturgeon Point Road and Highway No. 5 at Jerusalem Corner, 113.4 feet northerly of northwest corner of a 2 1/2 x 2 1/2 x 6 foot stone gate post on south side of road, 82.9 feet northeast of a 18 inch poplar, 74.8 feet northwest of northeast corner of a 20 x 30 foot cement block building, 73.9 feet northwest of a 30-inch oak, 30.2 feet southeast of northeast corner, 19.4 feet southeast of southwest corner and 13.0 feet southeast of southeast corner of 6 foot square gage house, 1/2 foot below the ground surface, being highest point on top of a stainless steel plug on top of 3/8-inch diameter galvanized steel pipe, 18 feet long. The pipe is encased in a 1-inch diameter steel pipe and the mark is protected by a 6 inch diameter concrete pipe, with cover 1/4 foot below the ground surface.

B.M. SERVAIS, (1973), is at Sturgeon Point, Erie County, New York, approximately 1.7 miles west and northwest along Sturgeon Point Road from the intersection of Sturgeon Point Road and Highway No. 5 at Jerusalem Corners, about 0.5 mile northwest of Y-intersection of Larkin and Sturgeon Point Roads, 87.8 feet northeast of fire plug, 84.2 feet south of most southerly 1/2 x 1/2 x 4 foot high concrete post, 81.1 feet east of northwest corner of Recreation Building, 22 feet east of centerline of Sturgeon Point Road, 1.1 feet southeast of utility pole No. NM 73-NYT 228, 1/4 foot below the ground surface, being highest point on top of a 5/8-inch diameter copper-coated steel rod, 9 feet long.

NORTHEAST MONITORING PROGRAM ON THE HEALTH OF THE NORTHEAST COASTAL WATERS OF THE UNITED STATES—Annual

National Marine Fisheries Service

Issuance: Annually.

Users: Federal, State, and local agencies involved in pollution monitoring.

For information, write or call: Ocean Assessments Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8951).

The *Northeast Monitoring Program on the Health of the Northeast Coastal Waters of the United States—Annual* is a report published annually by the National Marine Fisheries Service to synthesize surveys and studies of major individual programs, such as the NOAA pollution monitoring effort in which NOS is a participant, and to assess the health of the U.S. coastal waters during the year. Reported information on the monitoring program includes the goals and objectives, the plans, the sites and marine environments under study, the detailed analysis of survey data and water quality studies, the sediment quality, the biological effects, the contaminants in the resources of fisheries, and the recommendations for actions based on the results of the monitoring effort, together with numerous maps, tabulations, and references. The areas under study include the waters of the Northeast Atlantic, the ocean dumpsites off the east coast, and the New York Bight.

PHYSICAL OCEANOGRAPHIC AND SEDIMENT QUALITY DATA (CRUISE REPORTS)

Office of Oceanography and Marine Services

Issuance: Quarterly (3 months after a cruise is completed).

Users: Federal, State, and local agencies.

For information, write or call: Ocean Assessments Division, Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8951).

Physical Oceanographic and Sediment Quality Data, published in the *Cruise Reports*, are obtained from surveys performed as part of NOAA's pollution monitoring efforts, with NOS as an active participant to assess the health of U.S. coastal waters. Information in the report includes the cruise identification, the objectives, the methods, and the results depicted logically in graphs, maps, and tables; the measured data may include the units and/or degree of salinity, temperature, phytoplankton, chlorophyll, nutrients, dissolved oxygen, STD profiles, CSTD profiles, XBT's meteorological parameters, and sediment quality of the monitored waters. The areas under study include the waters of the northeast Atlantic, the ocean dumpsites off the east coast, and the New York Bight. The brief Cruise Reports prepared after each cruise of an area are incorporated eventually into the *Northeast Monitoring Program Report.*

USER'S GUIDE FOR THE ESTABLISHMENT OF TIDAL BENCH MARKS AND LEVELING REQUIREMENTS FOR TIDE STATIONS

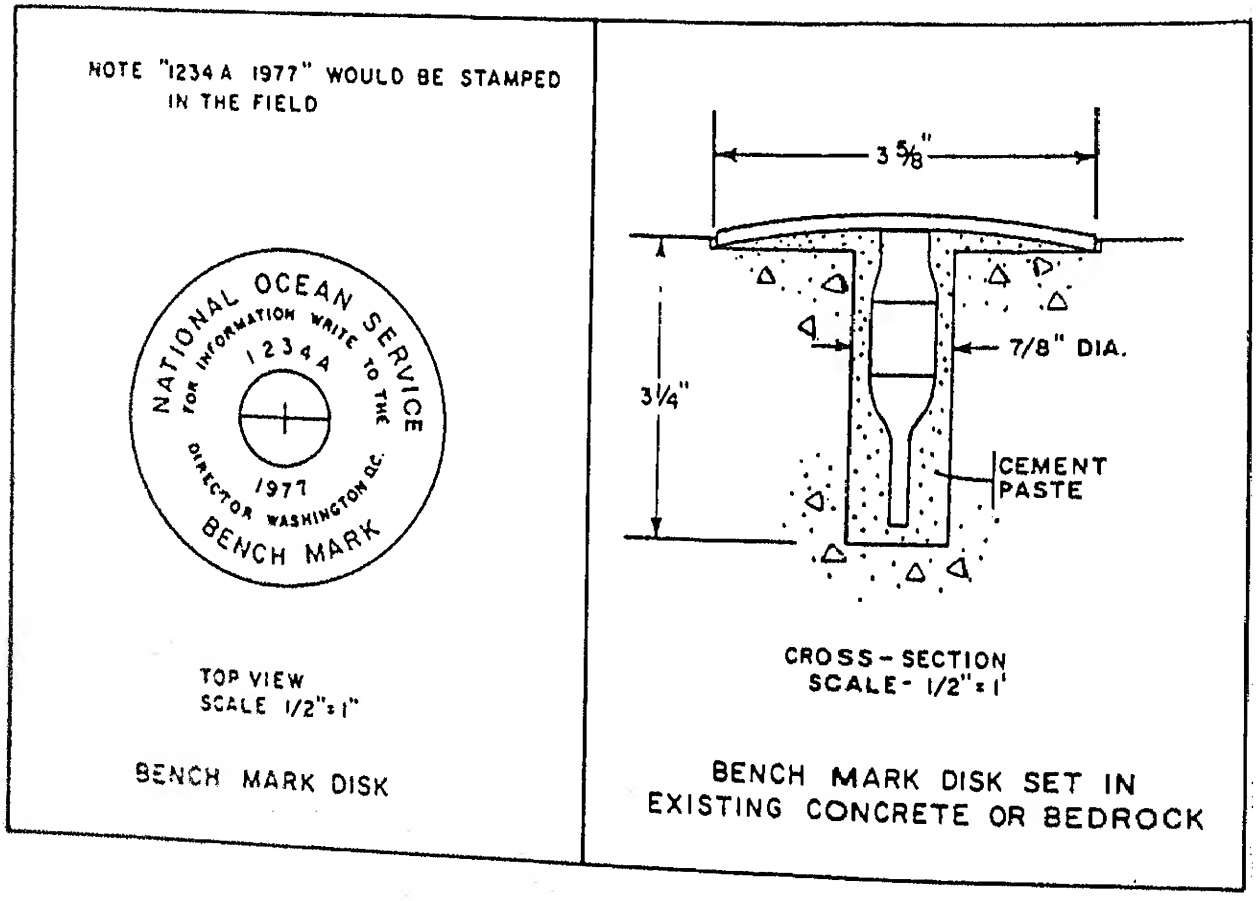
Office of Oceanography and Marine Services

Issuance: Presently being updated for a new bound volume edition.

Users: Federal and State agencies and foreign governments.

For orders and information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

The *User's Guide for the Establishment of Tidal Bench Marks and Leveling Requirements for Tide Stations* describes procedures NOS uses when establishing and maintaining a tide station for leveling purposes while installing a tidal bench mark system to which observed tides will ultimately be referred. It contains quality control procedures, documentation forms, computational methods, and acceptable errors in leveling.



MANAGEMENT-ORIENTED ANALYSES AND SYNTHESES REPORTS (planned)

Office of Oceanography and Marine Services

Issuance: As required.

Users: Regional and local resource managers, and Federal regulatory agencies.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

These reports are typically site-specific or regional reports which address a broad range of problems associated with ocean dumping, coastal use for waste disposal, and other general problems associated with disposal of anthropengenic wastes in the aquatic environment. "Ocean Waste Management Policy and Strategies International Symposium" is a report scheduled for publication.

REGIONAL AND DISCIPLINARY SYNTHESIS REPORTS

Office of Oceanography and Marine Services

Issuance: As necessary.

Users: Regional and local resource managers, Federal regulatory agencies, and the scientific community.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

Regional and Disciplinary Synthesis Reports are scientific products that summarize and interpret the body of available scientific information on a regional-specific or disciplinary issue. This information is synthesized from both NOAA funded and all other available sources and serves to document the present state-of-the-art as a basis for future research directions. "Ecological Stress and the New York Bight: Science and Management" (1982) is an example of this type of report.

ENVIRONMENTAL ATLASES AND SUPPORTING DATA BASES

Office of Oceanography and Marine Services

Issuance: Annually, biennially, or as required.

Users: Federal regulatory agencies and NOAA policy offices.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

Environmental Atlases and Supporting Data Bases are publications which synthesize scientific data bases in a graphic form. The precise format varies with the discipline or user requirements.

PUBLIC INFORMATION AND EDUCATION PUBLICATIONS

Office of Oceanography and Marine Services

Issuance: As they become available.

Users: Academia, Congress, and the general public.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

Public Information and Education Publications are one-time specific publications geared towards the public and academic sectors. They vary from books for the educated layperson to monographs or preceedings geared towards specific issues or disciplines. "Government Puget Sound" and Marine Technology Society Conference Proceedings—Marine Pollution Papers OCEANS '82 are two examples of this type of publication.

NATIONAL MARINE POLLUTION PROGRAM PLAN: FEDERAL PLAN FOR OCEAN POLLUTION RESEARCH, DEVELOPMENT, AND MONITORING—FISCAL YEARS 1981-85

Office of Oceanography and Marine Services

Issuance: Biennially.

Users: Federal and State agencies, private research firms, and academia.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

The National Ocean Pollution Research and Development and Monitoring Planning Act of 1978 mandates the *Plan,* which must include a detailed inventory of existing Federal programs, an assessment and ordering of National needs and problems, an analysis of the extent to which existing programs assist in meeting these priorities, recommendations for changes in the overall Federal effort where necessary, and a report on budget coordination efforts.

NATIONAL MARINE POLLUTION PROGRAM: AGENCY PROGRAM SUMMARIES

Office of Oceanography and Marine Services

Issuance: As necessary.

Users: Federal and State agencies, private research firms, and academia.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8487).

The program summaries describe research and monitoring plans of the individual agencies that participate in the overall program. The summaries are published together under one cover in a three-ring binder as Appendix 1 to the National Marine Pollution Program Plan.

NATIONAL MARINE POLLUTION PROGRAM: CATALOG OF FEDERAL PROJECTS

Office of Oceanography and Marine Services

Issuance: Annually.

Users: Federal and State agencies, private research firms, and academia.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6010 Executive Boulevard, Rockville, Md. [illegible]

The catalog summarizes and describes the appr imately 1,000 projects and 100 programs funded 11 Federal departments and independent agen involved in the National Marine Pollution Progr Projects included in the catalog are limited to th that focus on pollution problems in the oceans Great Lakes. The catalog is published as Append to the National Marine Pollution Program Plan.

SPECIAL PUBLICATIONS

Office of Oceanography and Marine Services

Issuance: Intermittently.

Users: Federal and State agencies, private research firms and academia.

For information, write or call: Office of Oceanography and Marine Services, National Ocean Service, NOAA, 6010 Executive Boulevard, Rockville, Md. [illegible]

The Marine Pollution Program issues one-time r on various issues pertaining to the National M Pollution Program Plan. Examples include "2nd agency Workshop on In-Situ Water Quality Se Biological Sensors," "Marine Oil Pollution: Fe Program Review," and "Summary of Non-Fed Funded Water Pollution Research, Development Monitoring Activities: Great Lake Region" (also, and Mid-Atlantic Region; West Coast Region South Atlantic Coast and Gulf Region).

MARINE CHARTING SERVICES

Marine Charting Services of the National Ocean Service are primarily available through the NOS Office arting and Geodetic Services, Nautical Charting Division. The Division determines requirements for a al program of nautical charting, which includes the construction and maintenance of nautical charts, the *oast Pilot*, and other marine products. The Division also directs field programs for shore-based hydrographic units; conducts photogrammetric surveys for coastal mapping, seaward boundaries, and storm evacuation and conducts technological development and application programs to maintain efficiency in survey data tion and chart production.

rst nautical chart published under NOS' earliest forerunner, the Survey of the Coast, portrayed Newark nd was produced with little detail, using a stone engraving. This first chart was a result of the U.S. Act of ary 10, 1807, which directed the President of the United States to have surveys made to determine the ons of the islands and shoals and places of anchorage along the coasts of the United States. From this ning, chart construction improved rapidly. A copperplate printing press was acquired in 1842, together killed workers who enabled the Survey to publish a chart of New York Bay and Harbor by 1844 with the definition possible from a copperplate engraving. Engravers today inscribe the more extensive chart details plastic-coated sheets. An additional improvement was color that enhanced the usefulness of the charts, added to the charts by hand and later by color lithographic presses. Now, the Division is designing and oping a computer-assisted system for the data acquisition, processing, and compilation of nautical charts et the demands of the maritime world.

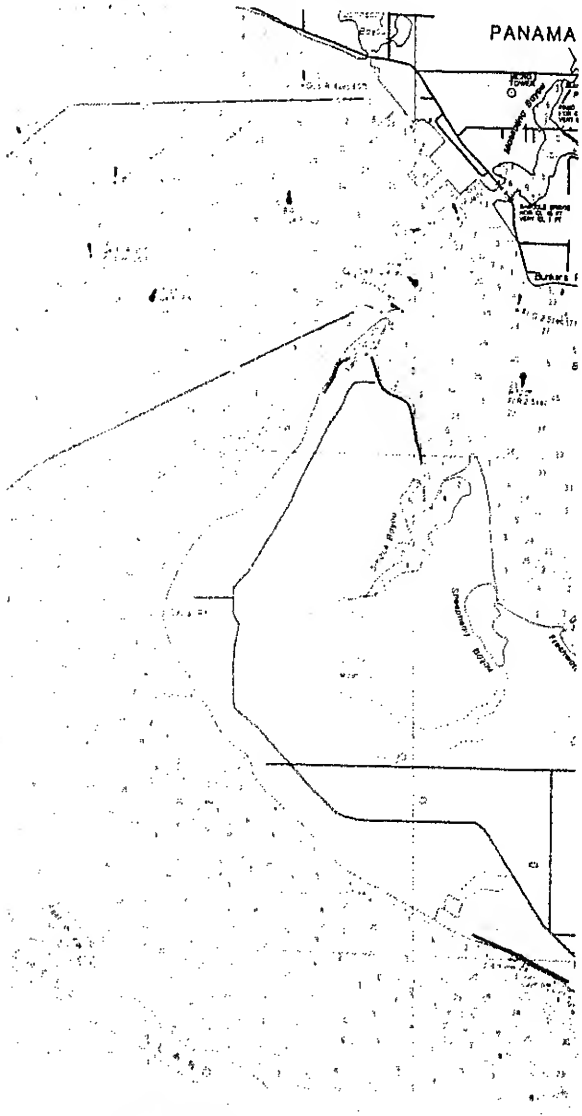
of the other products and services of the Division, although now highly refined and technically advanced, also begun in the early days of the agency. For example, the survey published its first *U.S. Coast Pilot* in after the Government purchased the copyright and stereotype plates for the commercially produced Coast from the Blunt Company. From the first hydrographic surveys in late 1834 and early 1835 when the agency used schooners to perform surveys, lead lines to measure soundings, and astronomic and dead ning to position a survey ship when out of sight of land, NOS has today advanced to the most up-to-date onic computer systems to guide its diesel-fueled hydrographic vessels, to record depth soundings, and d the shore-based hydrographic survey units. These systems record soundings in both analog (graphic) digital forms and have eliminated completely the need to record depths by hand. In addition, plane table ods for topographic work have given way to stadia devices and photogrammetric techniques.

CONVENTIONAL NAUTICAL CHARTS
Office of Charting and Geodetic Services

Issuance: Varies from semiannually to annually (or as required).

Users: U.S. Department of Defense; waterborne commerce; U.S. Coast Guard; boundary enforcement; coastal planning, engineering, and development projects; foreign governments; commercial fisheries; and recreational boat owners.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).



Conventional Nautical Chart No. 11391, St. Andrew Bay, 14th edition--the first chart produced by the NOS computer assisted cartographic compilation system.

Conventional Nautical Charts are printed re| ductions at a reduced scale of some portion of navigational part of the Earth's surface. These cl show the nature and shape of the coast, depth water, general configuration and character of bottom, prominent landmarks, port facilities, cu al details, dredged channels, aids to navigation, m hazards, magnetic variations, and maritime bound Changes brought about by people and nature re that nautical charts be constantly maintained t safe navigation. The NOS area of nautical cha responsibility includes the coastal marine environ of the continental United States, including the Lakes and Alaska, together with Hawaii, Puerto U.S. Virgin Islands, U.S. Trust Territories, and islands in the Atlantic and Pacific Oceans. Ther four classifications of nautical charts:

Sailing Charts, published at a scale smaller 1:600,000, are used for planning and for fixing the ner's position as the coast is approached from the ocean or for sailing along the coast between d ports. The shoreline and topography are gener and only offshore soundings, the principal naviga aids, outer buoys, and landmarks visible at con able distances are shown.

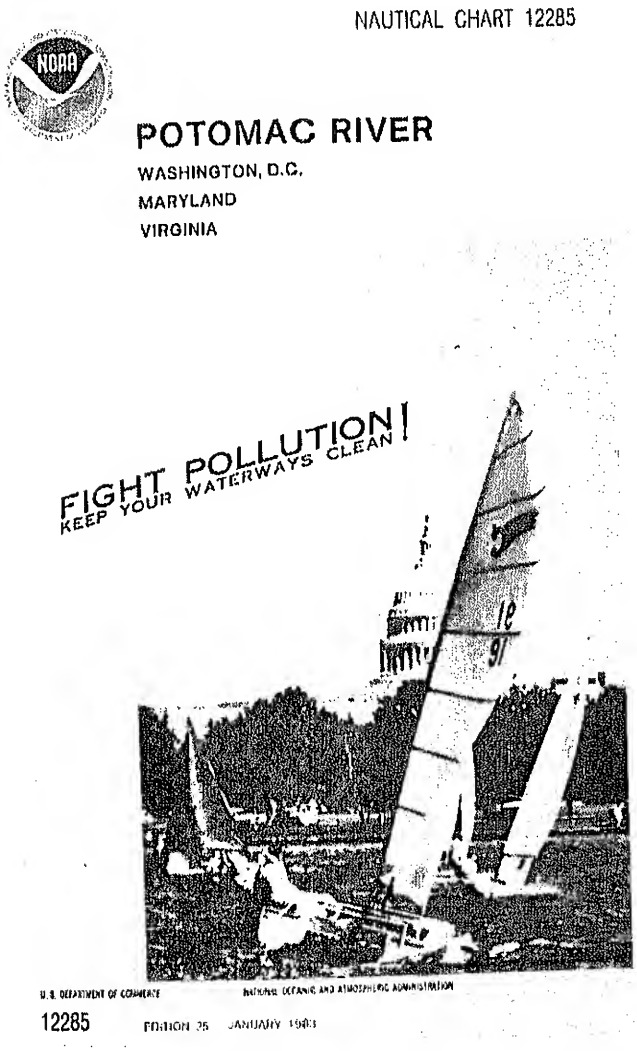
General Charts of the coast, published at scales 1:150,000 to 1:600,000, are used for coastal navi when a course is well offshore but can be fix landmarks, lights, buoys, and characteristic sounding

Coast Charts, published at scales from 1:50,(1:150,000, are used for close navigation inside ou reefs and shoals, in entering or leaving bays an bors of considerable size, and in navigating the inland waterways.

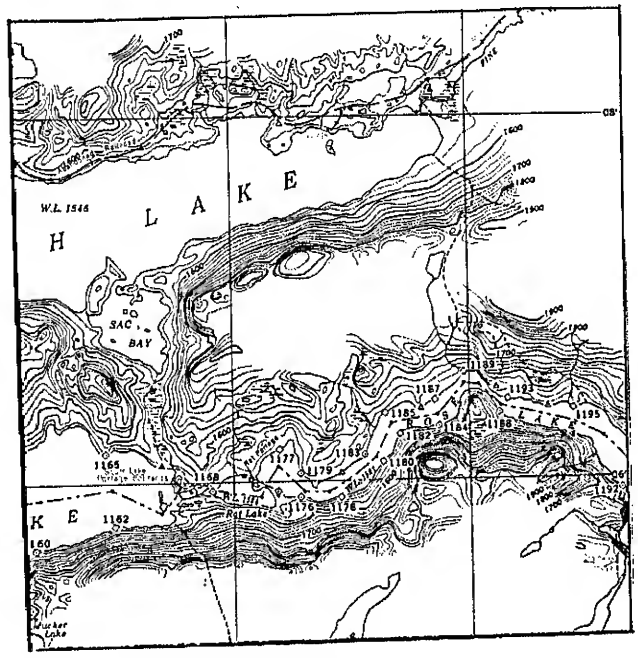
Harbor Charts, published at scales of 1:50,00 larger, are used for navigating in harbors and s waterways and for anchorage.

SMALL-CRAFT NAUTICAL CHARTS
Office of Charting and Geodetic Services

Issuance: Varies from 1 to 3 years.
Users: Waterborne commerce, coastal planning, engineering and development projects and recreational boat owners.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).



Small-Craft Nautical Charts are printed nautical chart reproductions at a scale from 1:10,000 to 1:80,000, designed for easy reference and plotting in limited spaces. These charts in some areas are the basic and sole chart coverage for all marine users. They portray regular nautical chart detail and other specific details of interest to small-craft operators, such as enlargements of harbors, tide, current, and weather data, rules-of-the-road information, locations of marine facilities, anchorages, courses, and distances. Types of Small-Craft Nautical Charts include *Folio Charts*, which consist of three or four sheets, printed front and back, and bound in a protective paper jacket; *Area Charts*, which are folded in convenient panels and enclosed in a protective jacket; *Route Charts*, which consist of a single long, narrow sheet, printed front and back, and designed for river and narrow waterway coverage, such as the Intracoastal Waterways; *Recreational Charts*, which are a series of large-scale chart pages for selected Great Lakes areas, published in book form; and *Canoe Charts*, which are a chart series of the Minnesota-Ontario border lakes. Most *Canoe Charts* do not show hydrography.



Seventh edition of the
Canoe Chart No. 14982, North Lake.

INTERNATIONAL NAUTICAL CHARTS
Office of Charting and Geodetic Services

Issuance: Every 2 years.

Users: Waterborne commerce, Federal agencies, and foreign governments.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

International Nautical Charts is a series of ch covering the north eastern Pacific Ocean and the Be Sea at a scale of 1:3,500,000 and 1:10,000,000 in international, standardized presentation. The n gational information includes depth curves; soun spacing; nautical symbols; and related data. Fif nations participate in this program which has l set up to provide a series of small-scale charts to the entire world.

Chart No.	Title
50	North Pacific Ocean—Eastern Part
500	North Pacific Ocean—West Coast of North America
501	North America, West Coast Mexican Border to Dixon Entrance
530	San Diego to Aleutian Islands and Hawaiian Islands
531	Gulf of Alaska—Strait of Juan de Fu to Kodiak Island
540	Hawaiian Islands

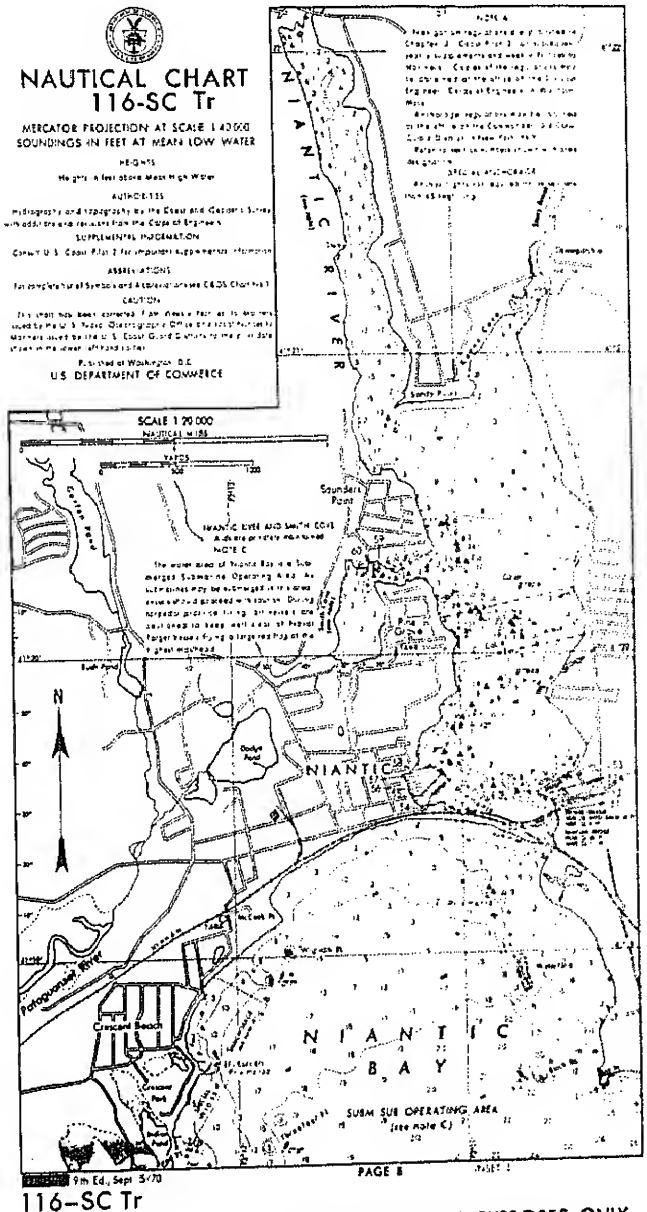
NAUTICAL TRAINING (TR) CHARTS
Office of Charting and Geodetic Services

Issuance: As required.

Users: U.S. Power Squadron and U.S. Coast Guard Auxiliary.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Nautical Training Charts are out-dated nautical charts used for educational purposes in training classes for small-boat operators. Training charts currently available include: 39 TR, Great Lakes; 116 SC TR, Long Island Sound; 440 TR, Savannah River and Wassaw Sound; 1210 TR, Narragansett Bay; and 6151 TR, Columbia River Entrance. Representational symbols and abbreviations are printed on the reverse side of some of the training charts.



Nautical Training Chart, 116-SC Tr, Long Island Sound.

NAUTICAL UPDATING SERVICE
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Ocean Service chart users.

For information, write or call: Marine Chart Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8800).

A *Nautical Updating Service* for selected nautical charts was begun in 1975 for certain NOS charts on an 8- and 12-year maintenance cycle and covering areas of little change The service offers to the chart owner a listing of Notice to Mariners corrections affecting the chart dated subsequent to the print date of the chart. A note that the service is available for a particular chart is printed on the appropriate charts. At present, only certain charts of Alaskan waters are included in this service.

ALASKAN CHARTS ON 144-MONTH PRINTING CYCLE FOR WHICH AN UPDATING SERVICE IS PROVIDED

16041	16082	16124	16441
16042	16083	16200	16442
16043	16084	16204	16446
16044	16085	16206	16462
16045	16086	16381	16463
16046	16087	*16382	16474
16061	16088	16421	16475
16062	16101	16430	16476
16063	16102	16431	16477
16064	16103	16432	16478
16065	16104	16433	16484
16066	16121	16434	16486
16067	16122	16435	16487
16081	16123	16436	16490

* Indicates updating note has not been printed on chart.

ALASKAN CHARTS ON 96-MONTH PRINTING CYCLE FOR WHICH AN UPDATING SERVICE IS PROVIDED

16300	16513	16522	16547	17363
16322	16514	16528	16549	
16323	16515	16529	16551	17365
16343	16516	16530	16568	
16363	16517	16531	16599	17404
16501	16518	16532	17301	
16511	16521	16535	17314	17424

An updating note has been printed on all the above charts.

NAUTICAL CHART SYMBOLS AND ABBREVIATIONS (CHART NO. 1)

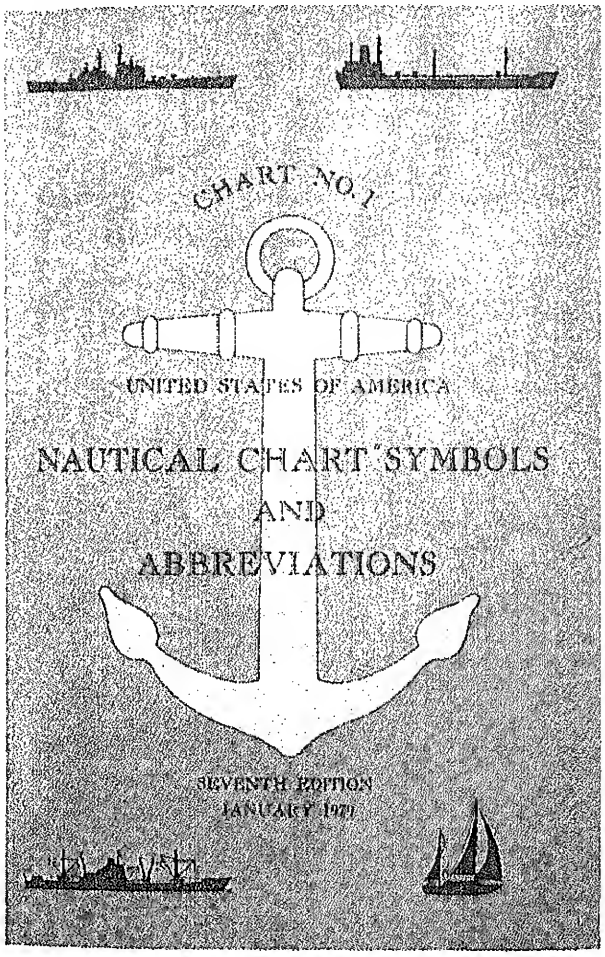
Office of Charting and Geodetic Services and the U.S. Defense Mapping Agency

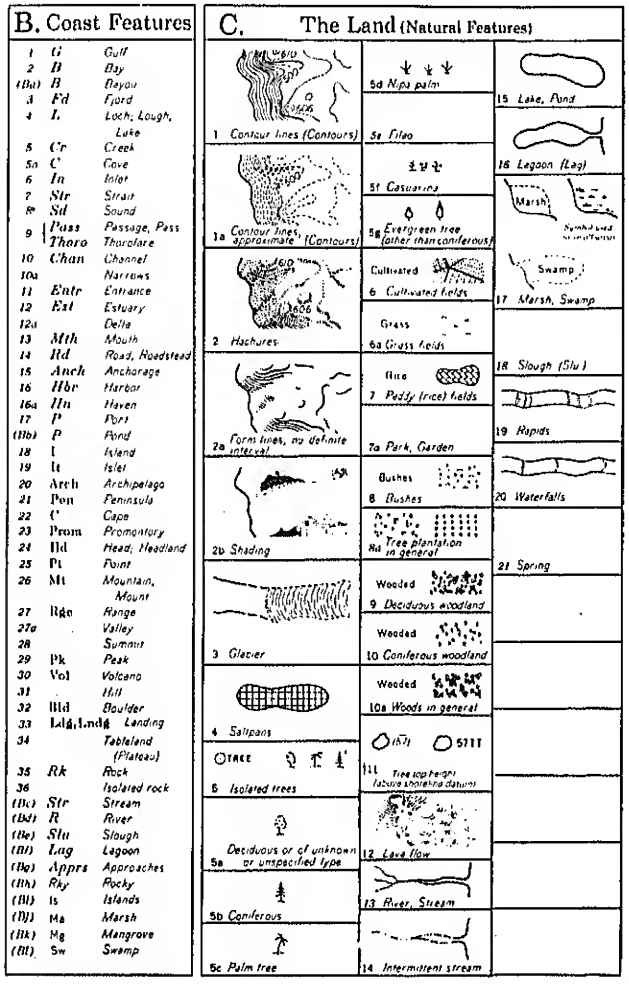
Issuance: As required.

Users: U.S. Department of Defense; waterborne commerce; U.S. Coast Guard; boundary enforcement agencies; coastal planning, engineering, and development projects; foreign governments; commercial fisheries; and recreational boat owners.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Chart No. 1 shows examples of and lists most of the symbols and abbreviations shown on NOS-published nautical charts. It also includes many definitions and other data valuable in understanding NOS nautical charts.





Coast features abbreviations and land symbols.

DISTANCES BETWEEN UNITED STATES PORTS

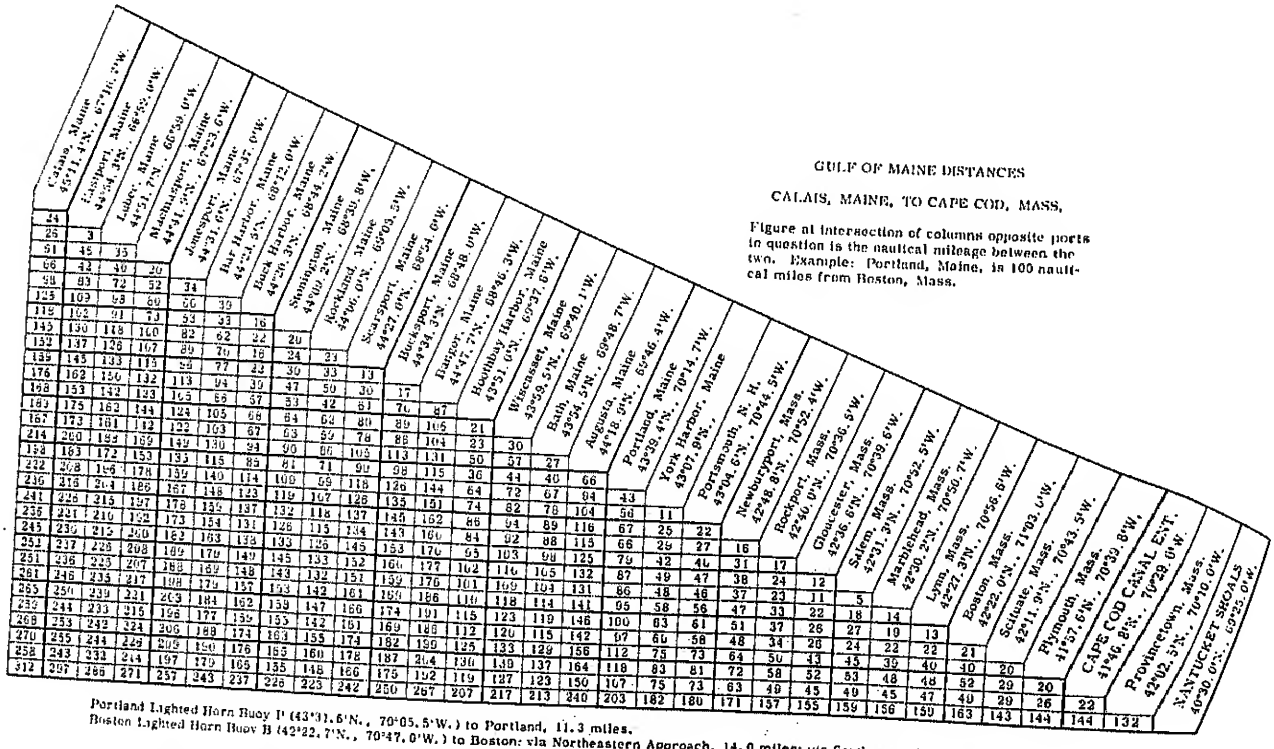
Office of Charting and Geodetic Services

Issuance: Varies.

Users: The U.S. Department of Defense; waterborne commerce; U.S. Coast Guard; commercial fisheries; planners; engineers; and developmental projects; and foreign governments.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Distances Betweeen United States Ports* is a byproduct of the *U.S. Coast Pilots* and assembles under one cover the distance tables computed for the U.S. Coast Pilots.



Portland Lighted Horn Buoy I' (43°31.6'N., 70°05.5'W.) to Portland, 11.3 miles.
Boston Lighted Horn Buoy B (42°22.7'N., 70°47.0'W.) to Boston: via Northeastern Approach, 14.0 miles; via Southeastern Approach, 14.5 miles.

Each distance is by shortest route that safe navigation permits between the two ports concerned. Vessels standing along the coast must make their own adjustments for non-direct routes. For example, the table shows a distance of 214 miles by direct route from Machiasport to Provincetown; the distance via Matinicus Rock and Cape Ann is 235 miles. Distances from Eastport to Machiasport and other ports farther southward are via deep Head Harbor Passage, which is 8 miles farther than via shallow Lubec Channel.

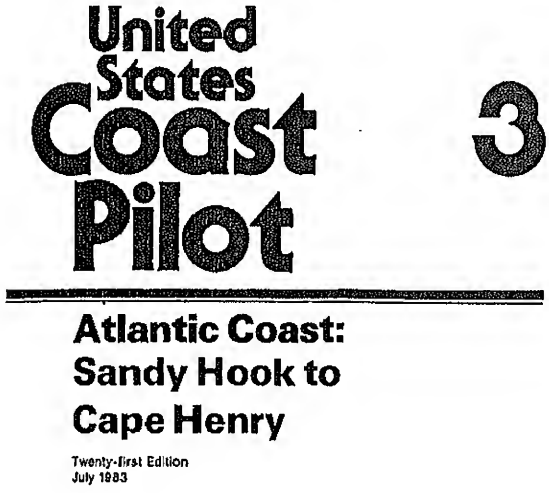
Gulf of Maine Port Distance Table.

U.S. COAST PILOTS
Office of Charting and Geodetic Services

Issuance: Annually (Pilots 1 through 7); biennially (Pilots 8 and 9).

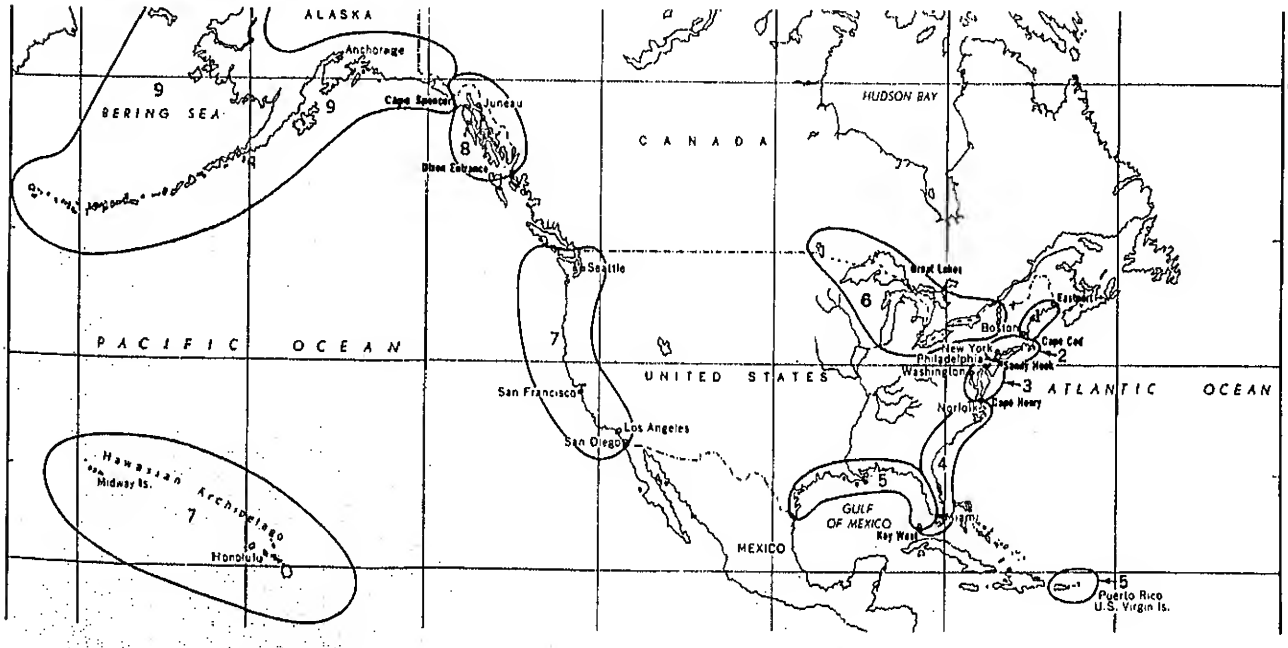
Users: U.S. Department of Defense; waterborne commerce; U.S. Coast Guard; commercial fisheries; planning, engineering, and developmental projects; foreign governments; and recreational boat owners.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).



U.S. Coast Pilots (sailing directions) is a series of books that contain a wide variety of information important to navigators of U.S. coastal, intracoastal, and Great Lakes waters. Nautical charts by themselves do not present all of the information useful to mariners, particularly when cruising in unfamiliar waters. To fill this void, supplemental textual information is provided the navigator through the *Coast Pilot* publications. This information includes general and local navigational regulations; descriptions of prominent natural and cultural shoreline features; channels, anchorages, dangers, tides, and current characteristics; weather conditions peculiar to an area; and listings of port facilities. The nine published volumes are kept current between new editions through announcements in the *Notice to Mariners*. *Coast Pilots* for the Atlantic Coast are *No. 1*, Eastport to Cape Cod; *No. 2*, Cape Cod to Sandy Hook; *No. 3*, Sandy Hook to Cape Henry; *No. 4*, Cape Henry to Key West; *No. 5*, Gulf of Mexico, Puerto Rico, and the Virgin Islands; for the entire Great Lakes area is *No. 6*, Lake Ontario, Erie, Huron, Michigan, Superior, and St. Lawrence River; for the Pacific Coast is *No. 7*, California, Oregon, Washington, and Hawaii; for Alaska is *No. 8*, Dixon Entrance to Cape Spencer and *No. 9*, Cape Spencer to Beaufort Sea.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service

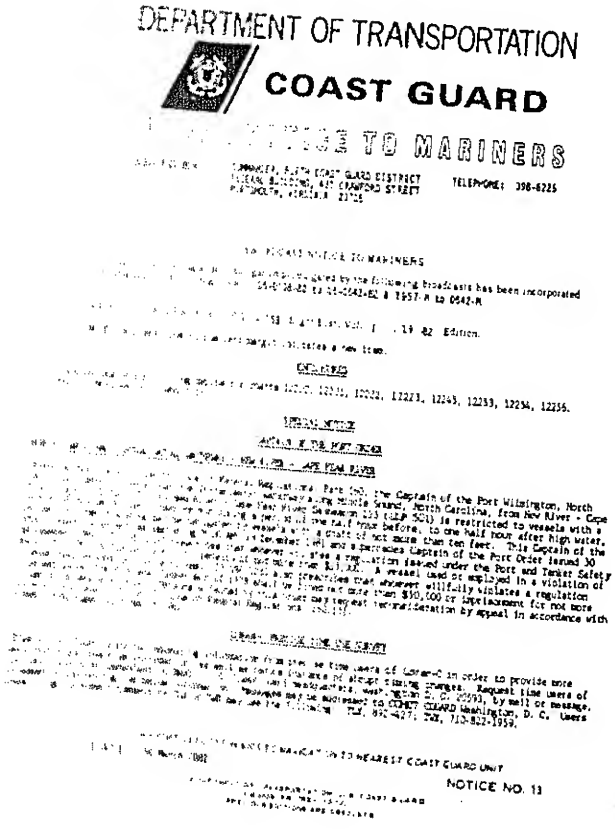


LOCAL NOTICE TO MARINERS
U.S. Coast Guard

Issuance: Weekly.

Users: U.S. Department of Defense; National Ocean Service; waterborne commerce; commercial fisheries; local governments; and recreational boat owners.

For orders and information, write or call: the United States Coast Guard District Office.


DEPARTMENT OF TRANSPORTATION

COAST GUARD

NOTICE TO MARINERS

NOTICE NO. 13

Local Notice to Mariners, issued by each U.S. Coast Guard District to disseminate important information affecting navigational safety within the District, includes data compiled by NOS. Since temporary changes to published data that are known or expected to be of short duration are not included in the DMA *Notice to Mariners*, the appropriate *Local Notice to Mariners* may be the only source of such information. Small-craft owners using the intracoastal waterways, other waterways, and small harbors that are not normally used by ocean-going vessels require the *Local Notice to Mariners* to keep charts and related publications up to date. NOS also prepares for inclusion chartlets (i.e., revised, page-sized, black-and-white portions of nautical charts) when the changes being announced are too extensive or detailed to be described as a text line in the *Notice*.

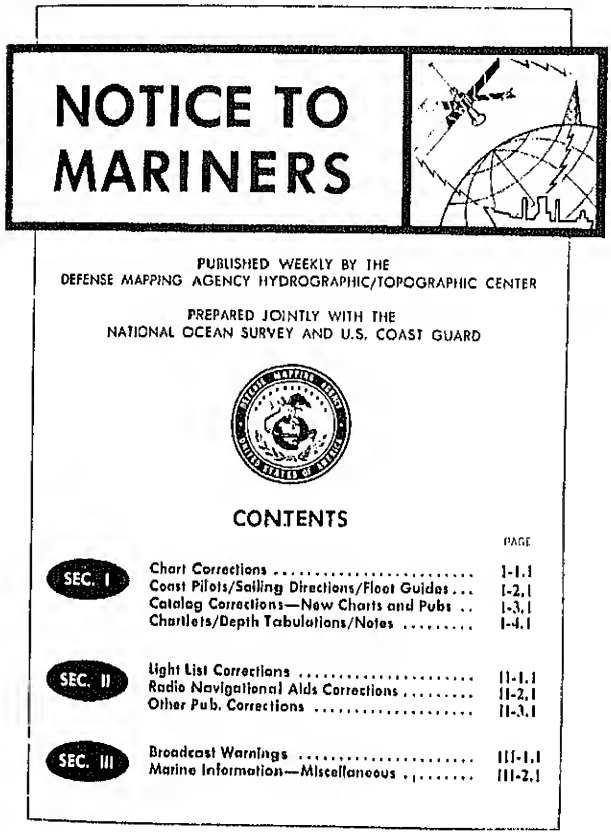
NOTICE TO MARINERS
Defense Mapping Agency Hydrographic/ Topographic Center

Issuance: Weekly.

Users: U.S. Department of Defense; NOS; waterborne commerce; U.S. Coast Guard; commercial fisheries; foreign governments; and recreational boat owners.

For orders and information, write or call: Defense Mapping Agency, Office of Distribution Services, Code: IMA, 6500 Brookes Lane, Washington, D.C. 20315 (202-227-3048).

Notice to Mariners, issued by the U.S. Defense Mapping Agency Hydrographic/Topographic Center, is prepared jointly with NOS and the U.S. Coast Guard. The *Notice*, a public information announcement of primary interest to navigators of deep draft vessels, presents important matters affecting navigational safety, changes to channels, navigational aids, and other information specifically useful for updating the latest editions of nautical charts and publications produced by these agencies. NOS also prepares chartlets—revised, page-sized, black-and-white portions of nautical charts—for inclusion in the *Notice* when the changes being announced are too extensive or detailed to be described as a text item.



NOTICE TO MARINERS

PUBLISHED WEEKLY BY THE
DEFENSE MAPPING AGENCY HYDROGRAPHIC/TOPOGRAPHIC CENTER

PREPARED JOINTLY WITH THE
NATIONAL OCEAN SURVEY AND U.S. COAST GUARD

CONTENTS

SECTION I NM

CATALOG CORRECTIONS

Stock No./ Chart No.	Title and contents of charts	Scale(s)	Edition No.	Edition Date	Price	DMAHTC Catalog
	NEW CHARTS					
OMEGA7726	Omega Plotting Chart Omega Pairs: AN, AC, DH, CH, AD 66N 90E; 82N 90E 65N 162E; 56 30N 135 00E	2,187,400	1	8/81	$4.15	1-N-L,34 1-N-A,12, 13,53
62AC062440	Asia - Persian Gulf - Southwestern Part - Qatar - United Arab Emirates - Ad Dawhah to Halat al Hubarraz (DECCA) 24 00 00N 25 23 00N 51 17 00E 53 27 00E	200,000	1	8/81	4.15	1-N-L,76 6-16,17, 26
	NEW EDITIONS					
14916	Wisconsin - Lake Winnebago and Lower Fox River	Various	6	7/81	6.60	1-N-L,43
14968	Minnesota - Lake Superior - Grand Portage Bay, Minn. to Shesheeb Point, Ont. (LORAN-C)	120,000	25	6/81	4.50	1-N-L,43
26229	West Indies - Cuba - South Coast - Guantanamo Bay	25,000	9	8/81	4.15	1-N-L,58 2-58
36000	English Channel (OMEGA)	806,500	30	9/81	4.15	1-N-L,62 3-28
53160	Mediterranean Sea - Italy - West Coast - Isole Ponziane to Capo Bonifati (LORAN-C) (Loran-C added)	223,590	11	8/81	4.15	1-N-L,70 5-18,34
53220	Mediterranean Sea - Pantelleria to Malta Including Southeast Coast of Sicilia (LORAN-C)	230,540	4	8/81	4.15	1-N-L,70 5-34
54020	Mediterranean - Greece - Turkey-Aegean Sea (LORAN-C)	768,451	7	8/81	4.15	1-N-L,71 5-34
	CHARTS CANCELED					
OMEGA7503	Chart canceled (Replaced by 7726)					1-N-L,33 1-N-A,10, 11,53
15XC015700	Chart canceled (Replaced by 38280,38300, 38320)					1-N-L,45, 1-34,35, 68

An example of catalog corrections included in the Notice to Mariners.

MARINE WEATHER SERVICES CHARTS (MSC)

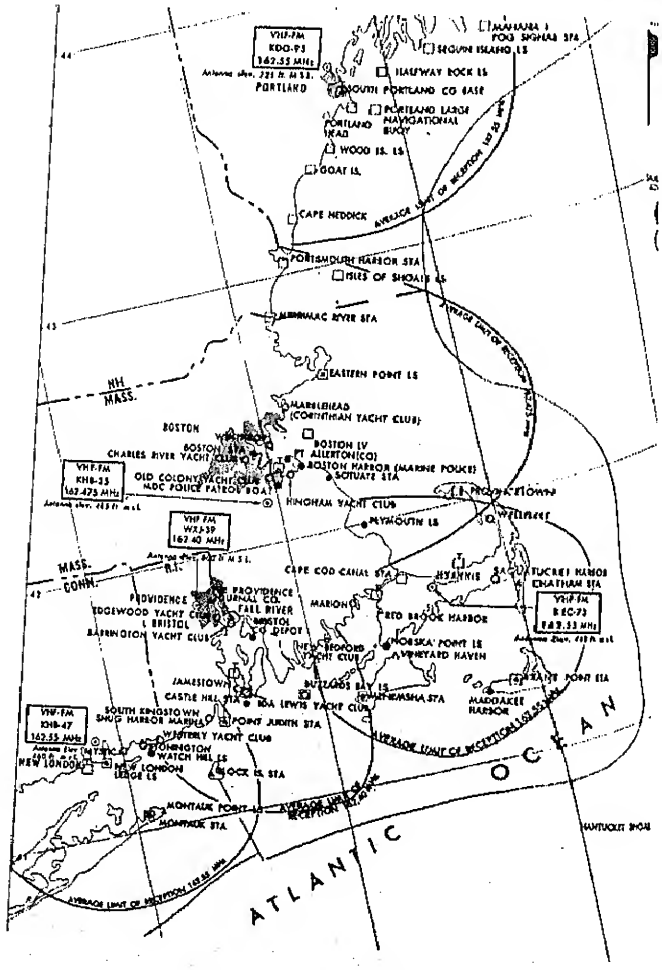
National Weather Service

Issuance: Annually.

Users: U.S. Department of Defense; waterborne commerce; U.S. Coast Guard; commercial fisheries; coastal planning; and recreational boat owners.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Marine Weather Services Charts, a series of 15 charts, list the National Weather Service radio stations and their office telephone numbers, the commercial radio stations that broadcast information on the weather and their schedule of weather reports, and the location of visual storm warning display sites. These charts cover the waters of the United States and Puerto Rico.



MSC-1, Eastport, Maine, to Montauk Point, N.Y., September 1980.

BATHYMETRIC MAPS
Office of Charting and Geodetic Services

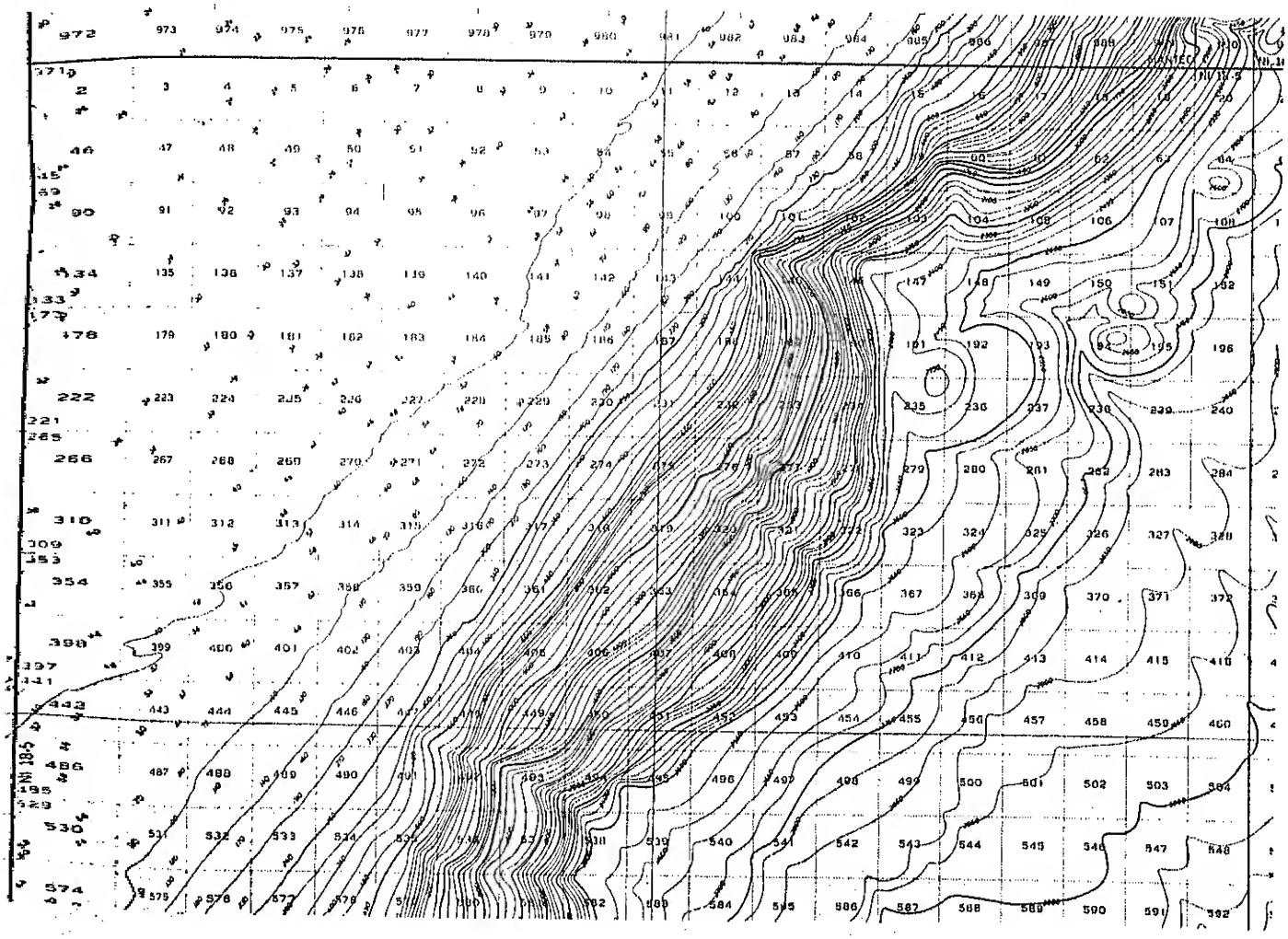
Issuance: As required.

Users: Planning, engineering, and development projects; oil and gas companies; and dredging and mining concerns.

For orders, write or call: Distribution Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Riverdale, Md. 20737 (301-436-6990).

For information, write or call: Marine Chart Branch, National Ocean Service, NOAA, Rockville, Md. 20852 (301-443-8855).

Bathymetric Maps, topographic maps of the sea floor, portray the size, shape, and distribution of underwater features through the use of depth contours and bathymetric data. These maps, which are not used in marine navigation, serve as the basic tools for performing scientific, engineering, marine, and marine environmental studies required in the development of energy and marine resources. Many of the 1:250,000-scale maps may be ordered with an overprint of the Minerals Management Service mineral lease block information.



Bathymetric Map, Russell, NI 81-5 (OCS), 1981.

TOPOGRAPHIC-BATHYMETRIC MAPS
Office of Charting and Geodetic Services and the U.S. Geological Survey

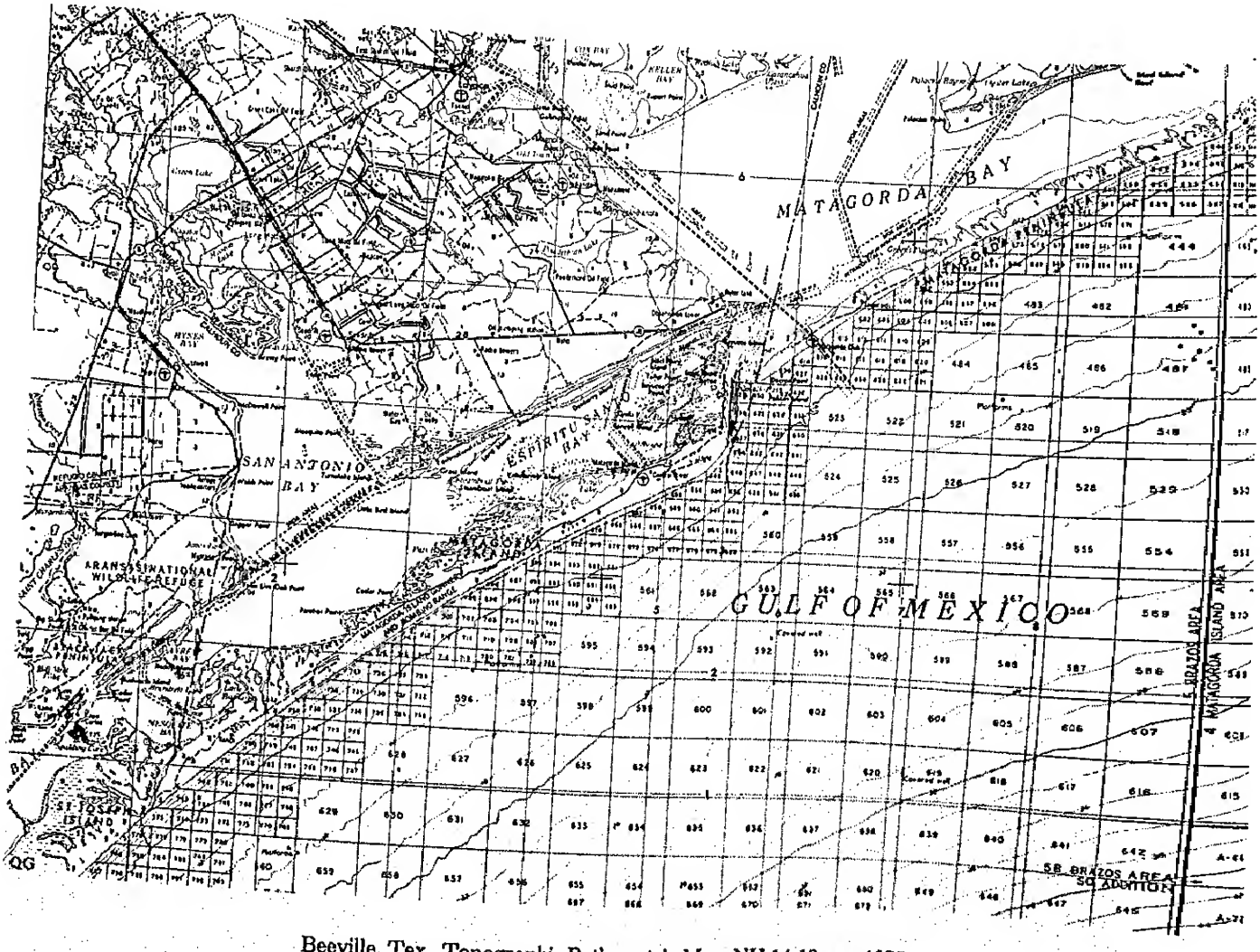
Issuance: As required.

Users: Planning, engineering, and development projects; oil and gas companies; and dredging and mining concerns.

For orders write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

For information, write or call: Marine Chart Division, National Ocean Service, NOAA, Rockville, Md. 20852 (301-443-8855).

Topographic-Bathymetric Maps is a series of maps at 1:24,000-, 1:100,000-, and 1:250,000-scales, which show a graphic presentation of the sea floor and adjacent land areas through the use of land and water contours and multiple tints. These maps, which are not used for marine navigation, assist scientific, engineering, marine, geophysical, and marine environmental studies that are required in the development of energy and marine resources. The 1:250,000-scale maps are overprinted with Minerals Management Service mineral lease block information.



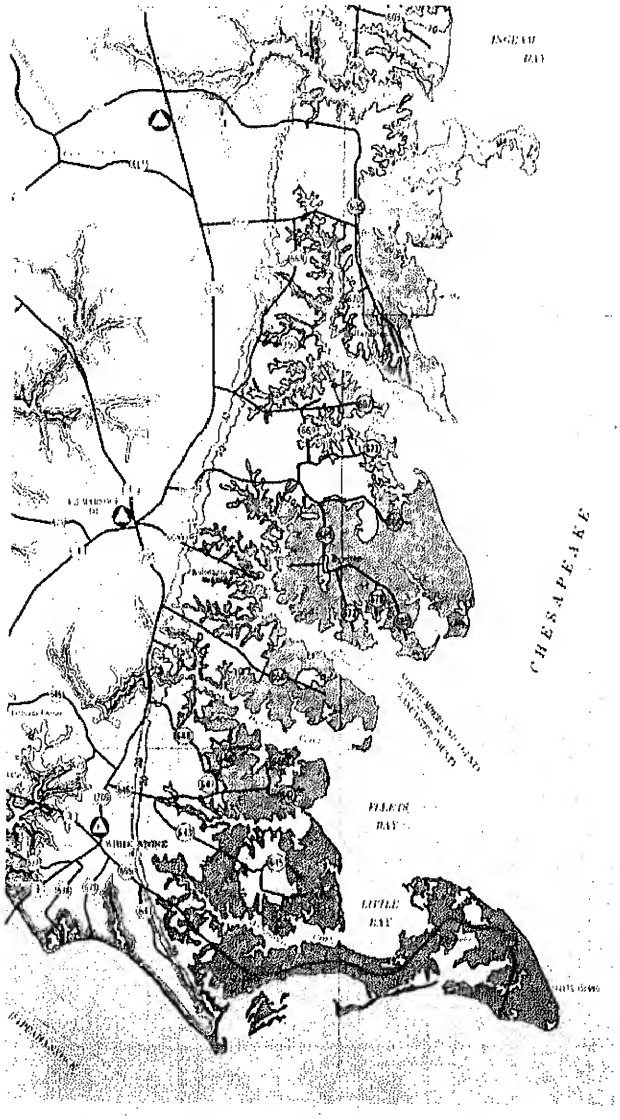
Beeville, Tex., Topographic Bathymetric Map, NH 14-12, rev. 1978.

STORM EVACUATION MAPS
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Weather Service, local emergency agencies, and land use planners.

For information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).



Storm Evacuation Map of the Rappahannock River.

Storm Evacuation Maps presently include 162 maps at a scale of 1:62,500. These maps are prepared in cooperation with the National Weather Service and other Federal agencies and are produced for high density population areas around the U.S. coastline subject to flooding as a result of river runoff, severe storms, and hurricanes. These maps show the main evacuation and feeder routes and the critical elevations along these routes. The critical elevations show the low points that might be engulfed and the high areas which are more likely to remain above flood waters, thus affording some degree of refuge. Both surfaced and unsurfaced evacuation roads are identified, along with Federal, State, and county route designations and the number of lanes for each road. Other features depicted on the map include the shoreline, areas of marsh and mangrove, airports, railroads, military, State, and county boundary lines, and geographic names. Urban populations and normal and summer populations of resort areas are also shown.

OFFSHORE MINERAL LEASING AREA MAPS

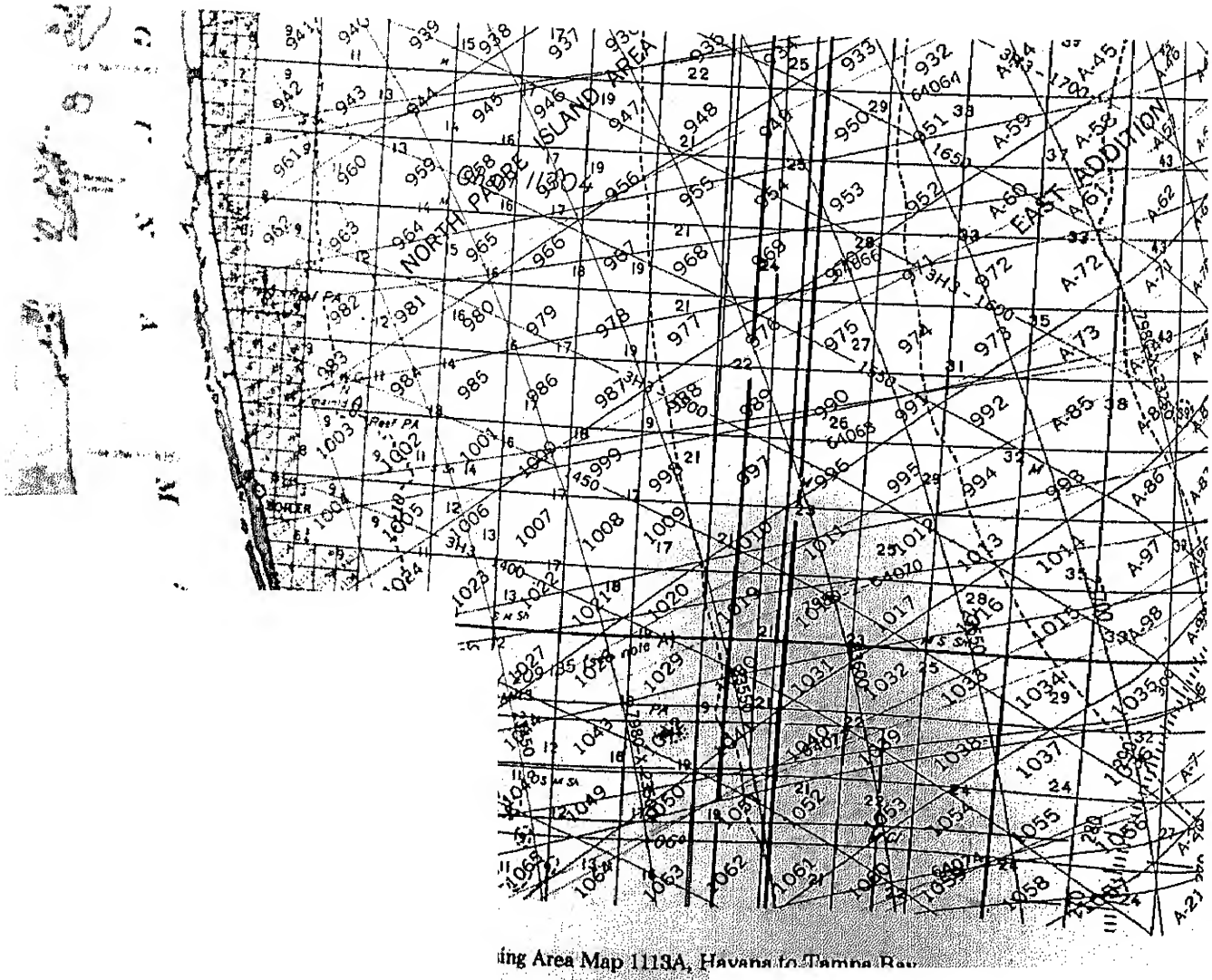
Office of Charting and Geodetic Services

Issuance: Annually.

Users: U.S. Department of Defense, waterborne commerce, U.S. Coast Guard, commercial fisheries, planning, engineering, and development projects.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Offshore Mineral Leasing Area Maps are small-scale nautical charts overprinted in red with data obtained from the Minerals Management Services (MMS) to show offshore mineral leasing areas and blocks. These maps, not for navigation nor official leasing block information, are extremely useful for planning purposes because they show block leases for extensive areas; whereas, the official MMS diagrams depict only small areas. The *Offshore Mineral Leasing Area Maps* series presently includes: 1113-A, Havana to Tampa Bay; 1114-A, Tampa to Cape San Blas; 1115-A, Cape St. George to Mississippi Passes; 1116-A, Mississippi River to Galveston; 1117-A, Galveston to Rio Grande.



ing Area Map 1113A, Havana to Tampa Bay

ERRITORIAL AND CONTIGUOUS ZONE
APS
Office of Charting and Geodetic Services

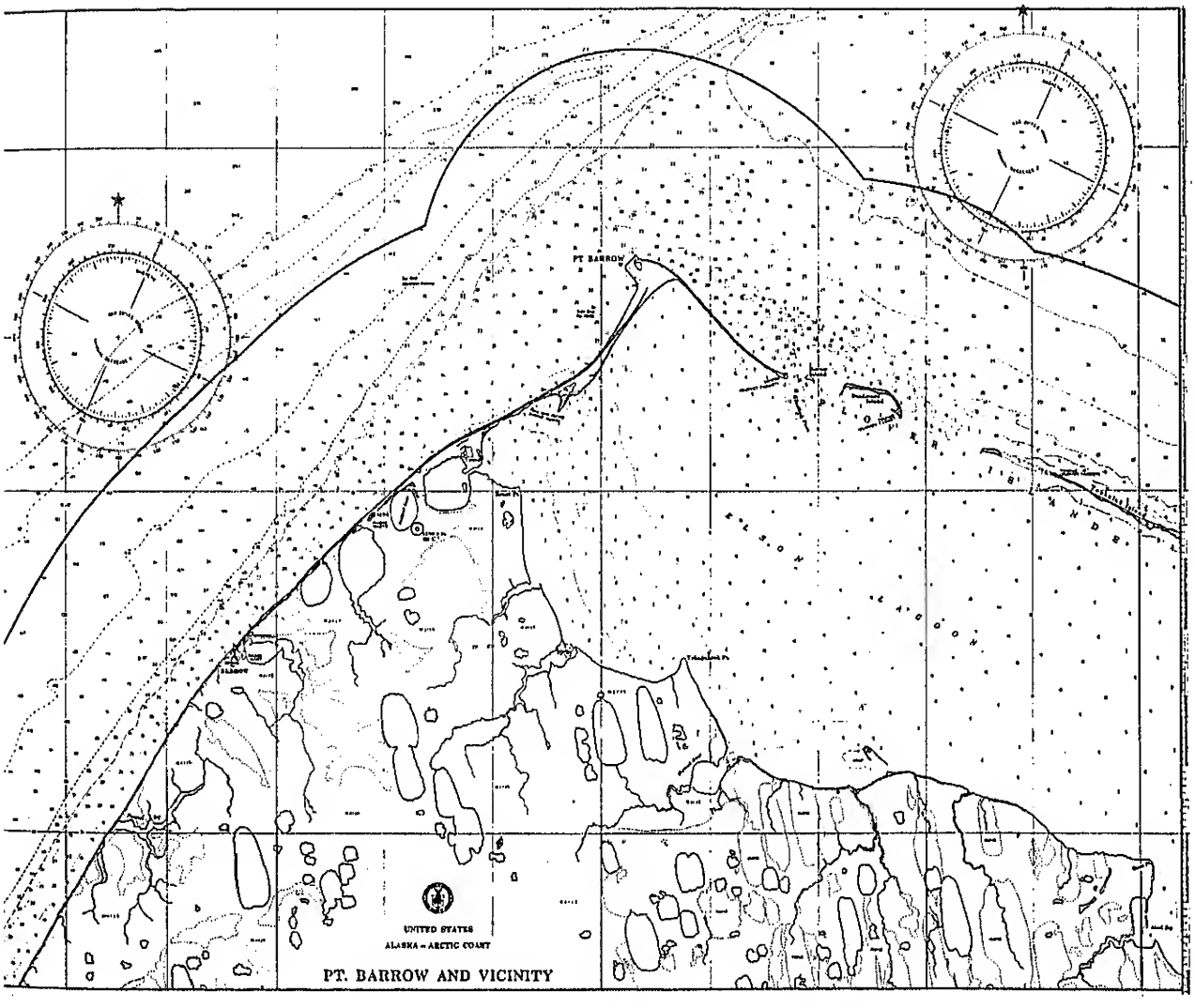
suance: 23 maps in the series.

sers: U.S. Department of Defense; waterborne com-erce; U.S. Coast Guard; commercial fisheries; bounda- enforcement; and foreign governments.

ır orders and information, write or call: Dis-ibution Branch, National Ocean Service, NOAA, verdale, Md. 20737 (301-436-6990).

Territorial and Contiguous Zone Maps portray the 3- and 12-mile limits, respectively, of the U.S. Maps identified with four-digit numbers and are 50 percent reductions of the standard NOS nautical charts. They are only available in black-and-white. These maps are being replaced by the standard size, full-color nautical charts on which the boundary lines are shown.

All remaining black-and-white reductions are scheduled for replacement with regular issue nautical charts by January 1989.



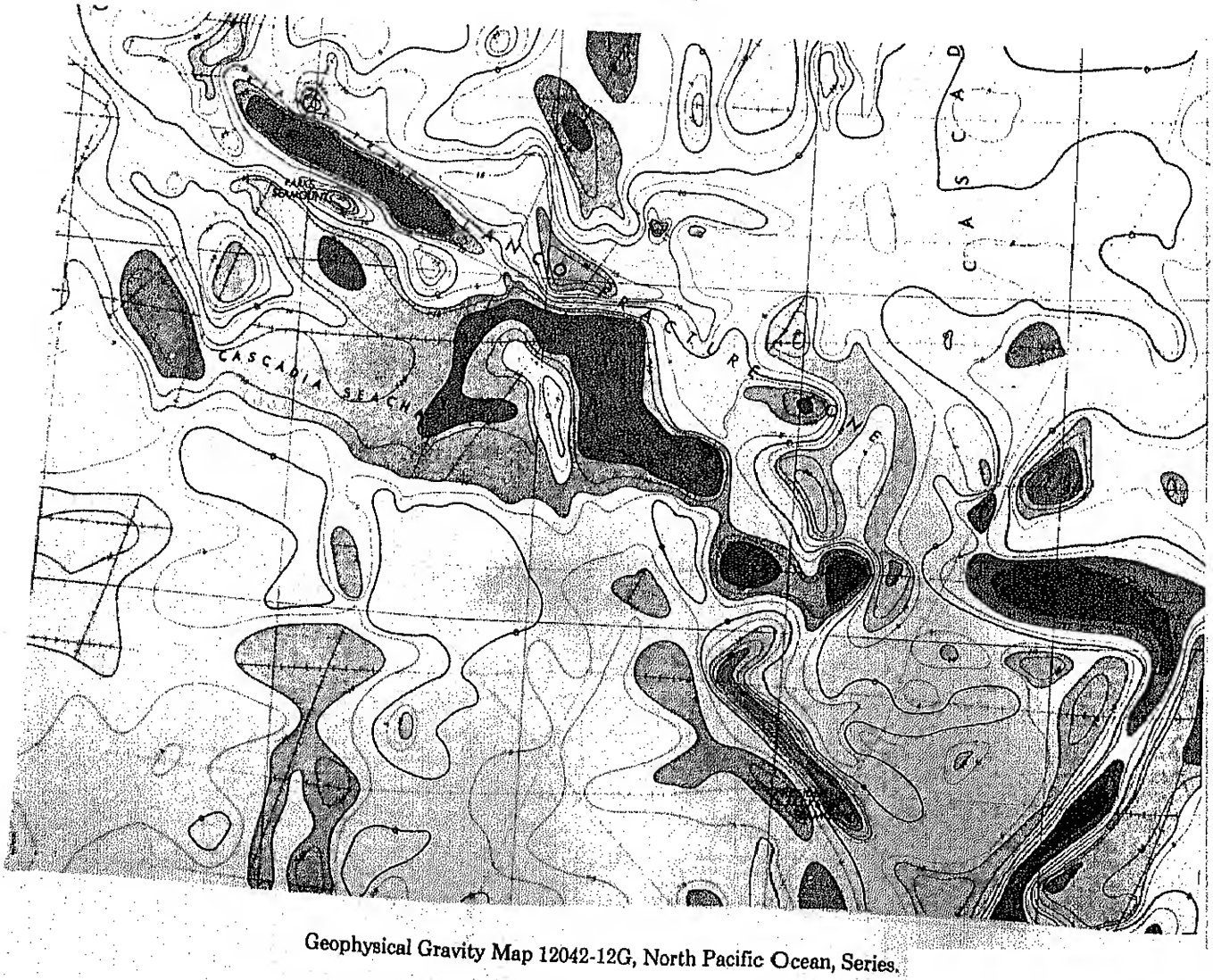
GEOPHYSICAL MAPS
Office of Charting and Geodetic Services

Issuance: Single issue of 23 maps.

Users: U.S. Department of Defense; waterborne commerce; commercial fisheries; and foreign governments.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Geophysical Maps consist of three sheets and some- times four (a base bathymetric map, a magnetic map and a gravity map, and where practicable, a sediment overprint—NOS 1308N-17S) and portray a graphic description of bathymetry and geophysical data for selected marine areas. The bathymetric map, when combined with the other three maps, serves as a base for making geological and geophysical studies of the crustal structure and composition of the floor of the ocean. Geophysical maps consist of two series: a 1:250,000-scale series, which contains the geophysical data for the Continental Shelf and Slope; and the SEAMAP series at a scale of 1:1,000,000, which cov- ers geophysical data gathered in deep sea areas, includ- ing on occasion the adjacent Continental Shelf and Slope.



Geophysical Gravity Map 12042-12G, North Pacific Ocean, Series.

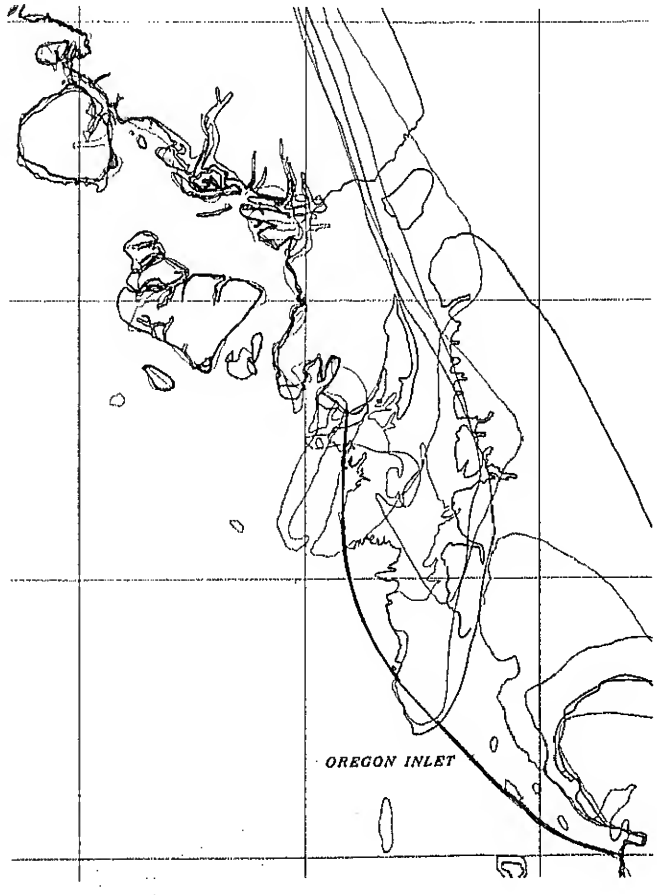
SHORELINE MOVEMENT STUDIES
Office of Charting and Geodetic Services

Issuance: As required.

Users: Coastal geologists and researchers, land use planners, and State and local governments.

For information, write or call: Coastal Engineering Research Center, COE, Kingman Building, Ft. Belvoir, Va. 22060, and/or Photogrammetry Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8405). At present, there is only one series: a set of 18 maps of Cape Henry, Va., to Cape Hatteras, N.C., which is obtainable from the Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Shoreline Movement Studies* is a cooperative program between the Photogrammetry Branch in the National Ocean Service and the Coastal Engineering Research Center in the U.S. Corps of Engineers Waterways Experiment Station to study shoreline position changes over time. The maps, at a scale of 1:24,000, depict the contemporary mean high water (MHW) shoreline and historic survey data contained in NOS archives. Primary emphasis is given to the ocean and bay shorelines of barrier islands. A joint NOS/U.S. Army Corps of Engineers Waterways Experiment Station Report is written to analyze shoreline change rates and suggest possible causes for these changes. Studies are completed for selected geographic areas and will be completed as additional cooperative agreements are arranged. The only set currently available is from Cape Henry, Va., to Cape Hatteras, N.C., with 18 maps.



Shoreline changes in Oregon Inlet, N.C. from a shoreline movement study.

DATES OF LATEST EDITIONS— NAUTICAL CHARTS

Office of Charting and Geodetic Services

Issuance: Quarterly.

Users: National Ocean Service nautical chart users.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Dates of Latest Editions—Nautical Charts*, lists the dates of the current nautical chart editions. Revisions of nautical charts are made at regular intervals because the environment that the charts portray changes over time, making further use of an out-of-date edition in navigation potentially dangerous. Therefore, a "new edition" reflects changes of such importance to navigation that all previous printings of the chart are obsolete. Revisions may be based on corrections from the *Notice to Mariners* and/or other sources. A "revised print" of a chart indicates a revision that does not supersede a current edition. The number and date of a "new edition" are shown in the lower left corner of the chart.

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
ROCKVILLE, MD. 20852

DATES OF LATEST EDITIONS

Nautical Charts & Misc. Maps

OCTOBER 1, 1983

(Issued Quarterly)

Charts with edition dates prior to those listed are obsolete for use in navigation

LEGEND

NEW CHART - No prior edition
NEW EDITION - Prior edition is now OBSOLETE
DISCONTINUED - Chart is cancelled and no longer available
REVISED PRINTING - Charts with an Edition Date or a Revised Date prior to that listed are cancelled and must be removed from Agents stock.
Includes Loran-A Lines of Postion
Includes Loran-C Lines of Position
Includes Loran-A and Loran-C Lines of Position
SC Small Craft Chart
Metric
/ Feet-Fathoms and Metric back to back
Omega

NEW NUMBERING SYSTEM

Effective July 1, 1974, the National Ocean Service, in cooperation with the Defense Mapping Agency Hydrographic Center, began a new national chart numbering system designed to provide a uniform method of identifying charts. Effective October 1, 1977 charts should be ordered by the new number.

MAIL CHART ORDERS TO:
Distribution Branch N/CG33
National Ocean Service
Riverdale, Md. 20737

Enclosed in U.S. FUNDS remittance payable to NOS, N/CG33, Department of Commerce.

IMPORTANCE OF UP-TO-DATE CHARTS

The date of a chart is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Natural and artificial changes, many of them critical, are occurring constantly, and it is important that navigators use up-to-date charts.

This publication can be up-dated between printings by referring to the Notice to Mariners published by the U.S. Coast Guard District Offices and the Defense Mapping Agency Hydrographic Center.

6

CHART NUMBER	SCALE	PRICE	EDITION NUMBER	EDITION DATE	LATEST REVISED DATE
12358	40,000	5.50	14	Jul 10 1982	
12359 SC	40,000	5.60	2	Jul 10 1982	
12362	10,000	5.50	14	Apr 8 1979	
12363	80,000	5.50	31	Jul 23 1983	
12364 SC	40,000	4.75	22	Nov 13 1982	
12365	20,000	5.60	18	Mar 17 1979	Apr 11 1981
12366	20,000	5.50	18	Aug 8 1981	
12367	20,000	5.50	16	Aug 29 1981	
12368	20,000	5.50	17	Feb 27 1982	
12369	20,000	5.50	19	Aug 28 1983	
12370	20,000	5.50	14	Jul 24 1983	
12371	20,000	5.50	19	Oct 2 1982	
12372 SC	40,000	4.75	21	Sep 18 1982	
12373	20,000	5.50	13	May 23 1981	
12374	20,000	5.50	10	Jul 21 1979	
12375	20,000	5.50	16	May 6 1983	
12377	20,000	5.50	10	Feb 14 1981	
13003	1,200,000	5.50	35	Jun 5 1982	
13006	675,000	5.50	25	Sep 18 1982	
13009	500,000	5.50	21	Sep 18 1982	
13200	400,000	5.50	24	Nov 28 1981	
13204	220,000	5.50	8	Jan 30 1982	
13205	80,000	5.50	27	Apr 23 1983	
13209	40,000	5.50	16	Jun 19 1983	
13210 SC	40,000	3.50	2	Jun 19 1982	
13211	20,000	5.50	10	Jun 13 1981	
13212	20,000	5.50	20	Jan 1 1983	
13213	10,000	5.50	33	Apr 17 1982	
13214	20,000	5.50	21	Aug 25 1979	
13215	40,000	5.50	10	Mar 12 1983	
13217	15,000	5.50	8	Jun 19 1982	
13218	80,000	5.50	26	Jan 8 1983	
13219	15,000	5.50	6	Mar 20 1982	
13221	40,000	5.50	43	May 28 1983	
13222 SC	40,000	4.75	18	Jul 10 1982	
13223	20,000	5.50	28	Jan 16 1982	
13224	20,000	5.50	29	Jun 13 1981	
13225	10,000	5.50	30	Jun 7 1980	
13227	10,000	5.50	10	Mar 1 1980	
13228	20,000	5.50	7	Sep 25 1982	
13229 SC	40,000	4.75	19	Feb 26 1983	
13230	40,000	5.50	33	Oct 30 1982	
13233	40,000	5.50	10	Jun 20 1981	
13235	5,000	5.50	2	May 30 1981	
13236	20,000	5.50	21	Jun 27 1981	
13237	80,000	5.50	30	Jun 18 1983	
13238	80,000	5.50	10	May 16 1981	
13241	40,000	5.50	11	Nov 7 1981	
13242	10,000	5.50	16	Jun 11 1983	
13244	[illegible]	5.50	35	Jul 30 1983	
13246	80,000	5.50	26	Jul 17 1982	
13248	[illegible]	5.50	5	Sep 5 1981	
13249	[illegible]	5.50	10	Mar 1 1980	
13250	[illegible]	5.50	4	Oct 17 1981	
13251	[illegible]	5.50	13	Apr 11 1981	
13253	[illegible]	5.50	13	Jun 27 1981	
13260	[illegible]	5.50	[illegible]	Mar 27 1982	
13267	[illegible]	5.50	[illegible]	Oct 17 1981	
13268	[illegible]	5.50	[illegible]	Sep 13 1980	
13270	[illegible]	5.50	[illegible]	Nov 20 1982	
13272	[illegible]	[illegible]	[illegible]	Mar 20 1982	
13273 SC	[illegible]	[illegible]	[illegible]	Mar 20 1982	
13274 SC	40,000	4.75	[illegible]	May 28 1983	
13275	[illegible]	5.50	[illegible]	May 30 1981	
13276	10,000	5.50	[illegible]	Jul 4 1981	
13278	80,000	5.50	[illegible]	Mar 5 1983	
13279	[illegible]	5.50	[illegible]	May 7 1983	
13281	10,000	5.50	[illegible]	May 29 1982	
13282	20,000	5.50	7	Apr 18 1983	
13283	20,000	5.50	12	Apr 10 1982	

Title page and entries from the Dates of Latest Editions—nautical charts.

NAUTICAL CHART CATALOGS 1 THROUGH 4 AND MAP AND CHART CATALOG 5

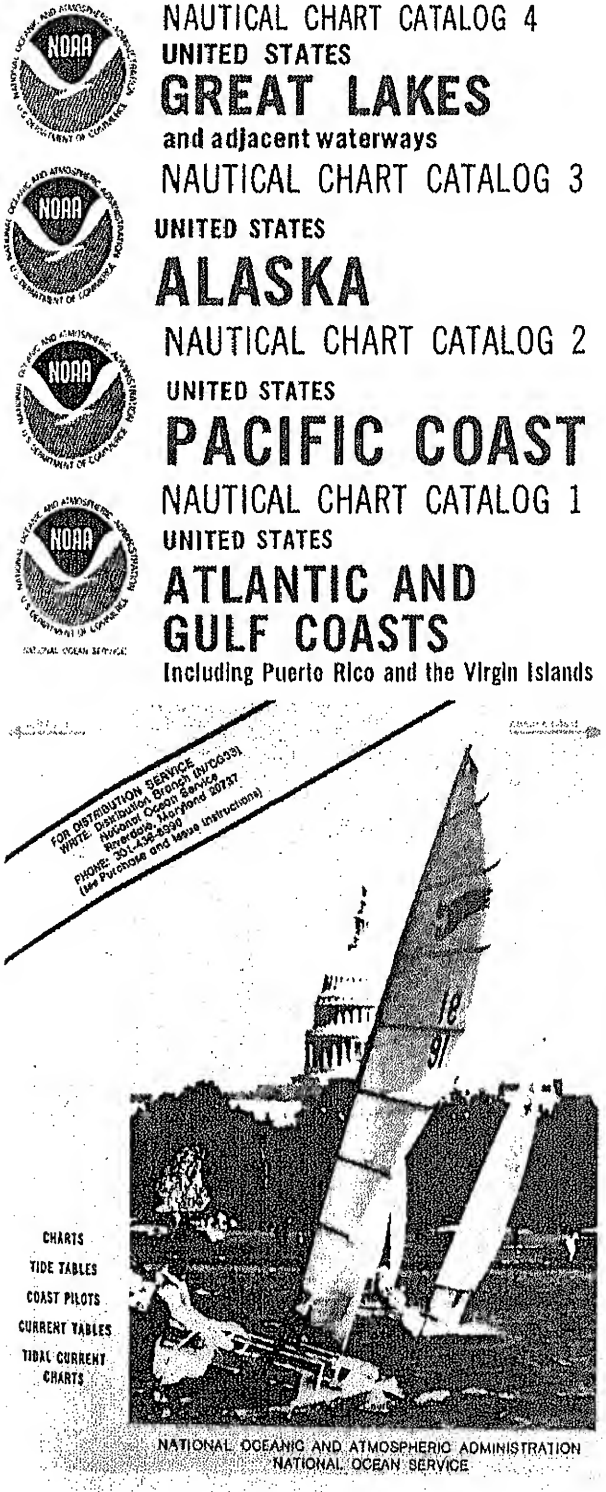
Office of Charting and Geodetic Services

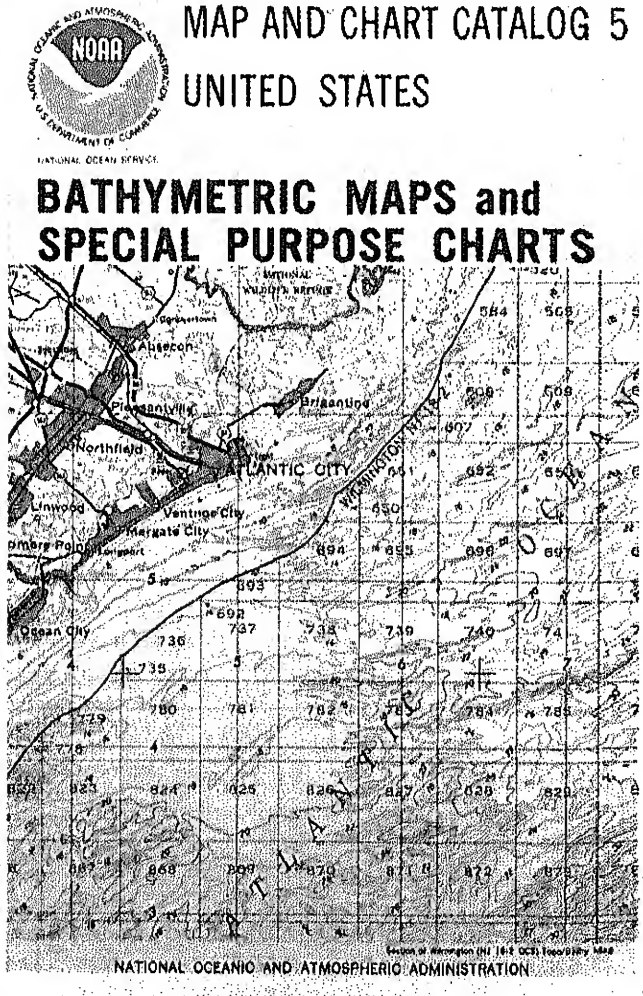
Issuance: Annually.

Users: General public.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Nautical Chart Catalogs 1 through 4, produced and maintained by NOS, contain a brief description of each nautical publication NOS produces, the publication's price, and other pertinent information needed in selecting and ordering the nautical product. The catalogs are supplemented by inserts used for order forms. *Nautical Chart Catalog 1* covers the U.S. Atlantic and Gulf Coasts, including Puerto Rico and the U.S. Virgin Islands; *2*, covers the U.S. Pacific Coast, including Hawaii, Guam, and the Samoa Islands; *3*, Alaska, including the Aleutian Islands; and *4*, the U.S. Great Lakes and adjacent waterways. *Map and Chart Catalog 5* lists Bathymetric Maps and special purpose charts that NOS and other agencies produce.





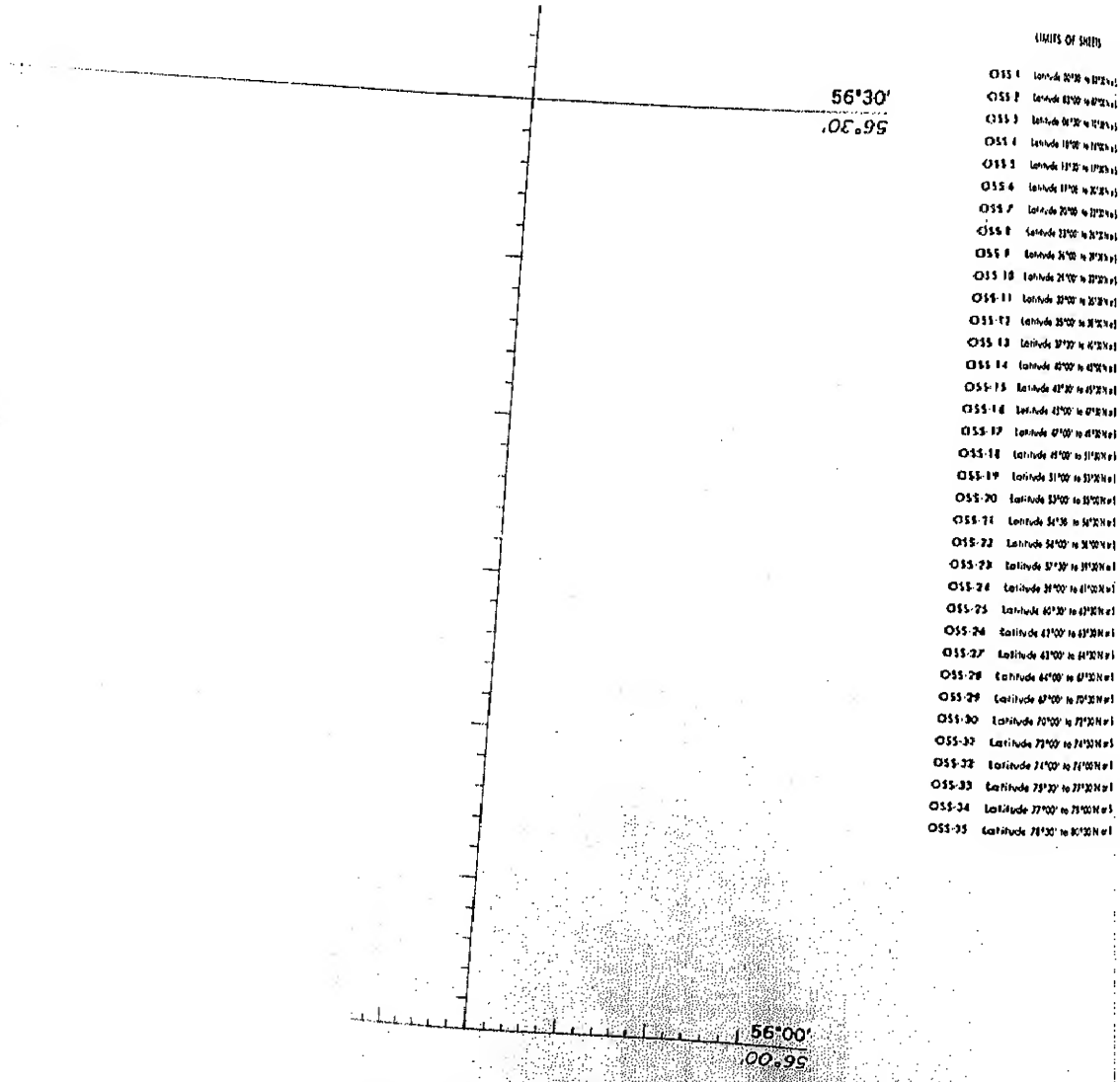
OCEAN SURVEY SHEETS (OSS)
Office of Charting and Geodetic Services

Issuance: 30 plotting sheets.

Users: Waterborne commerce and Federal mapping agencies.

For orders and information, write or call: Data Control Station, Hydrographic Survey Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8408).

NOS Ocean Survey Sheets is a series of 30 plotting sheets designed to conform closely to the U.S. Navy Bathymetric Sheets and used primarily for NOS trackline surveys. The OSS, published at twice the scale of the U.S. Navy Sheets, are used to span the area from latitude 0° 30 S to 72° 30 N and are turned 180° for use in southern latitudes.



ection of OSS-22 and Index.

PLOTTING SHEETS FOR GENERAL BATHYMETRIC CHARTS OF THE OCEANS

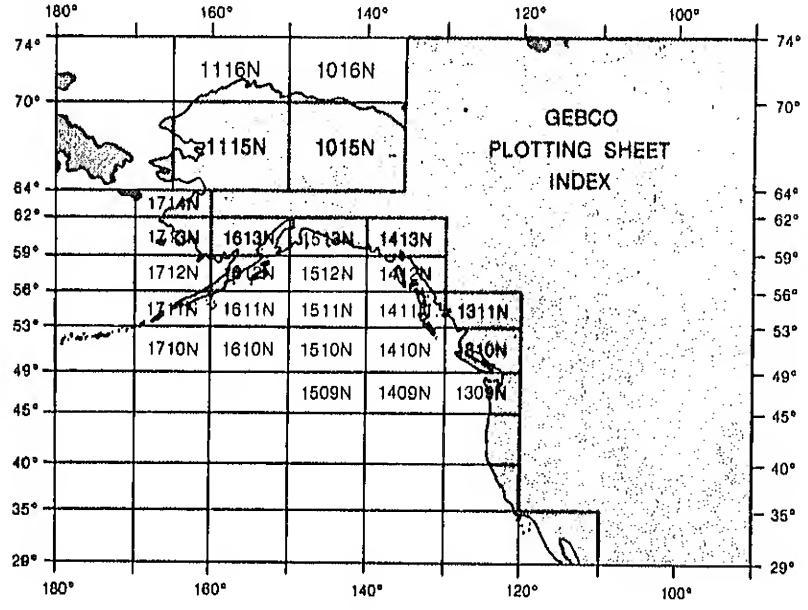
Office of Charting and Geodetic Services

Issuance: 26 sheets at present.

Users: U.S. Department of Defense; waterborne commerce; U.S. Coast Guard; commercial fisheries; planning, engineering, and development projects; and foreign governments.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *General Bathymetric Charts of the Oceans* is a series of 26 plotting sheets for the Gulf of Alaska, the Beaufort Sea, parts of the North Pacific Ocean above 45° north, and the eastern portion of the Bering Sea. These charts were produced by NOS under the auspices of the International Hydrographic Organization. They contain only numerical bathymetric information, designated as Corrected Sounding Compilation (CSC), Uncorrected Sounding Overlay (USC), and Origin of Sounding Overlay (OSO). A listing of these sheets are shown in the *NOS Map and Chart Catalog 5.*



No.	CSC	USO	OSO	+Date of Comp.	No.	CSC	USO	OSO	+Date of Comp.
1015N	•			1966	1510N	•	•	•	1964
1016N	•			1966	1511N	•			1963
1115N	•			1966	1512N	•	•	•	1963
1116N	•			1966	1513N	•	•	•	1964
1309N	•	•	•	1964	1610N	•		•	1965
1310N	•	•	•	1965	1611N	•		•	1965
1311N	•			1964	1612N	•		•	1965
1409N	•	•	•	1965	1613N	•			1965
1410N	•	•	•	1965	1710N	•		•	1965
1411N	•	•	•	1964	1711N	•		•	1965
1412N	•	•	•	1964	1712N	•			1965
1413N	•	•	•	1964	1713N	•			1965
1509N	•	•	•	1964	1714N	•			1966

\+ Includes only depth information available only to that date.
I Incomplete
• CSC = Corrected sounding compilation available
• USO = Uncorrected sounding overlay available
• OSO = Origin of soundings overlay available
• Ozalid copies available.
• Stable base plastic positives available at current cost.

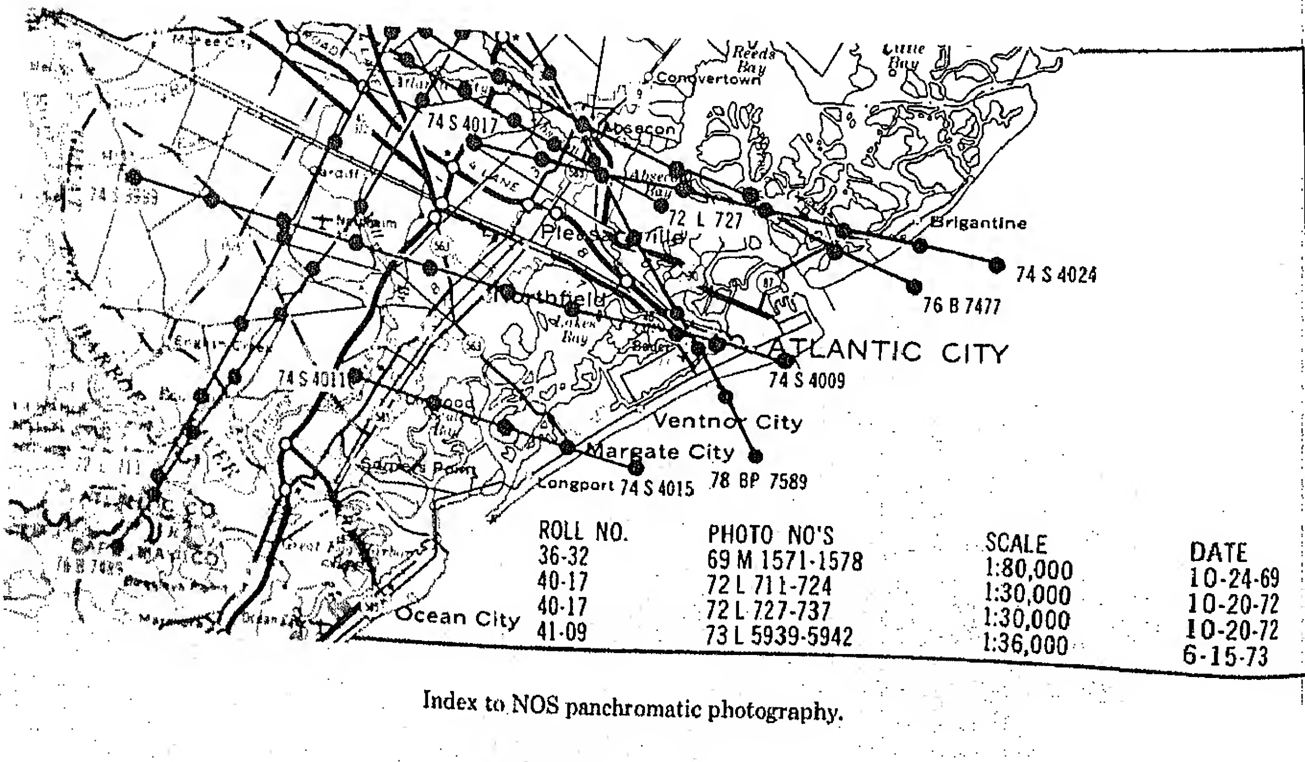
AERIAL PHOTOGRAPHS
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Ocean Service, U.S. Department of Defense, U.S. Department of the Interior, and U.S. Department of Energy; engineering, design, and survey projects; academia; and foreign governments.

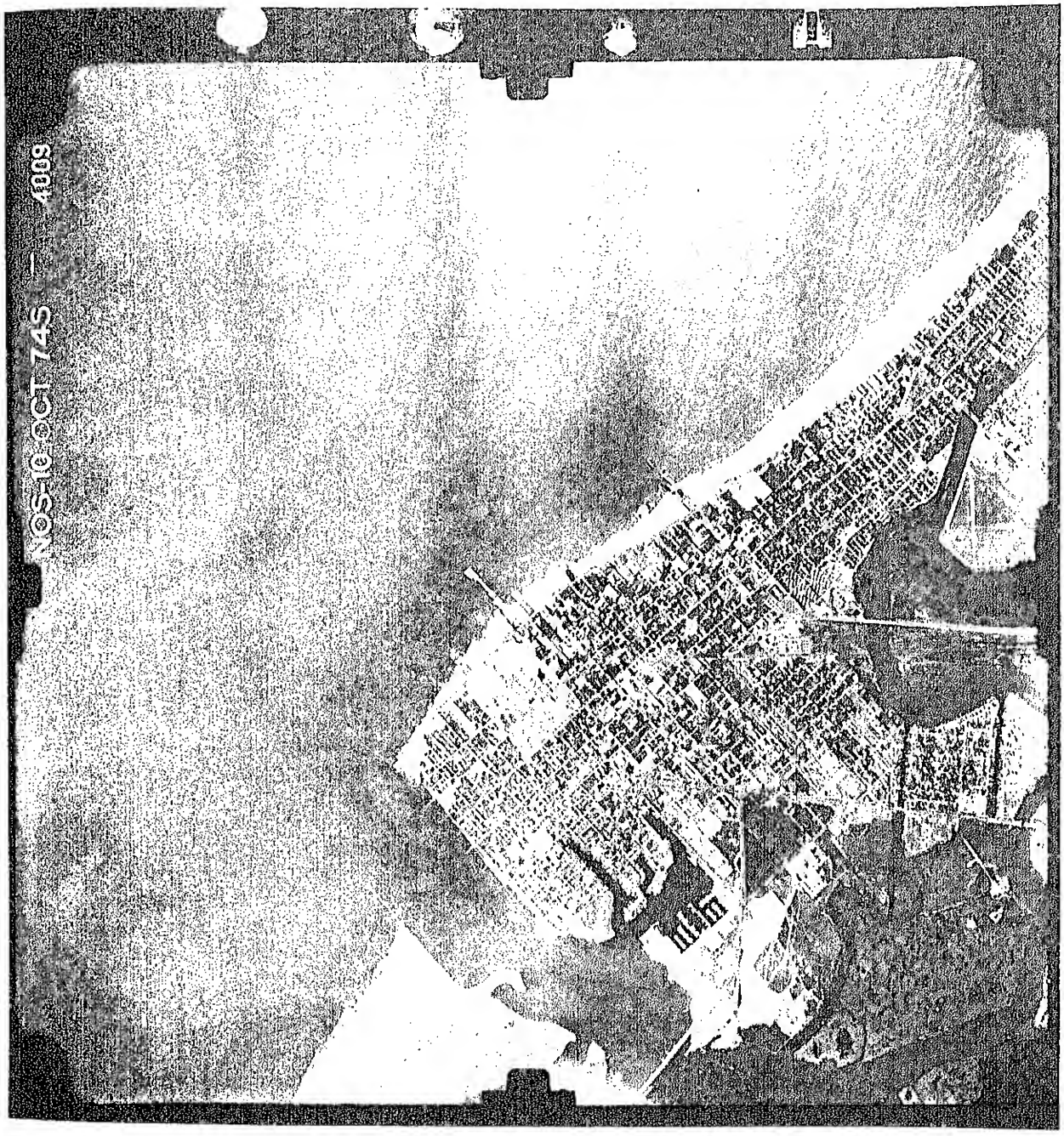
For orders and information, write or call: Photogrammetry Branch, Office of Charting and Geodetic Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8601).

Aerial Photographs, together with hydrographic shoreline surveys, today provide the basic data base for compiling coastal maps. The transition from plane table surveys to aerial photogrammetry in the U.S. Coast and Geodetic Survey (a forerunner of NOS) began in 1927. Furthermore, panchromatic film, which had been used in aerial photogrammetry, has been replaced by regular color emulsions on the standard imagery, with supplemental color infrared and black-and-white infrared photography being used more and more frequently within the last 5 years. NOS produces 60 percent of the photography in support of its nautical charting operations and 40 percent in support of the NOS/FAA Airport Survey Program. The NOS/ FAA photographs, which NOS compiles ultimately into *Airport Obstruction Charts,* are first compiled into a manuscript for a field survey party to edit. The photography shows the various flight lines and the center point of each frame and is limited to strictly black-and-white panchromatic film. All aerial photographs are shown in indexes: a 1° x 1° index for the coastal areas and an airport index for airport photography. Different indexes are available for color, color infrared, panchromatic, and black-and-white infrared photographs. The basic size of each photograph is 9" x 9" with enlargements up to four times available for all panchromatic prints. In addition, black-and-white film positives are available.



ROLL NO.	PHOTO NO'S	SCALE	DATE
36-32	69 M 1571-1578	1:80,000	10-24-69
40-17	72 L 711-724	1:30,000	10-20-72
40-17	72 L 727-737	1:30,000	10-20-72
41-09	73 L 5939-5942	1:36,000	6-15-73

Index to NOS panchromatic photography.



Aerial Photograph of the vicinity of Atlantic City, New Jersey.

HYDROGRAPHIC SURVEYS
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Ocean Service, oil and gas companies, law firms, engineering and development projects, academia, and private industries.

For orders and information, write or call: Data Control Section, Hydrographic Surveys Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (302-443-8408).

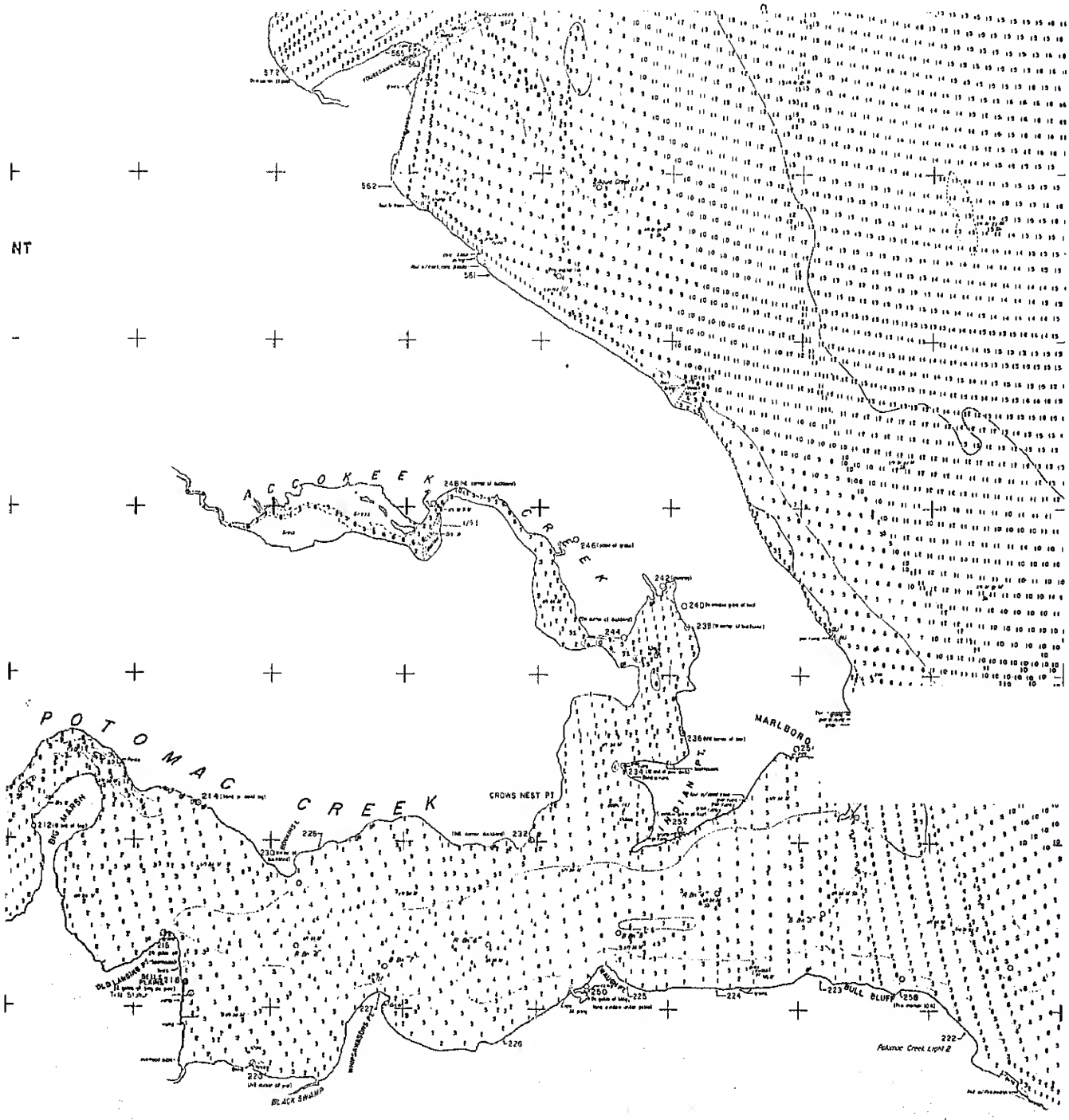
Hydrographic Surveys (smooth sheets) are detailed survey studies of water areas and provide the least depth on shoals; the controlling depths in natural waterways; and the positions of islands, rocks, reefs and obstructions. Horizontal control for NOS hydrographic surveys has always been based on the geodetic control network. From this basic control, early survey points were established on which horizontal sextant fixes were taken to position the sounding vessel. Out of sight of land, various methods were used for positioning on the early surveys, including precise dead reckoning, until later Radio Acoustic Ranging and still later Shoran and EPI (electronic positioning indicators) were devised. Today, when modern electronic methods are inappropriate, sextant fix methods are still used. Most NOS hydrographic data are now collected by computer supported field systems (Hydroplot/Hydrolog), which output the information in both graphic and digital form. Accurate vertical control of hydrographic surveys is tied to tidal observation; and other pertinent corrections are tied to the raw soundings, according to the type of sounding equipment utilized. Most hydrographic surveys are reduced to true depths below an accepted datum plane (such as mean lower low water). There are four types of hydrographic surveys:

Basic Hydrographic Surveys are performed to standards that assure the survey area has been investigated systematically. This means the depths are acquired at a spacing sufficient to reasonably ensure all underwater hazards to navigation have been found; the configuration of the bottom, including channels, shoals, banks, and reefs, can be detailed correctly on the chart; the least depths over all known dangers to navigation are determined; appropriate landmarks and fixed aids to navigation are properly described and positions adequately determined; bottom samples are obtained at a frequency to define the general physical characteristics of the bottom; observations are obtained to provide necessary calibration of all data acquisition systems used in the survey; and the survey data acquired are adequate to supersede all prior survey data for the area. This type of survey is performed in both the near and offshore areas and comprises the largest number of surveys NOS performs.

Navigable Area Surveys (NAS) are designed to provide detailed contemporary hydrographic survey data in areas of increased marine traffic where little or no contemporary data exists. Retaining the general principles of basic surveys, the coverage required under this survey concept is less comprehensive in that the coverage does not require the development of the hydrography in nearshore areas nor does it require a complete field edit of the survey area. These surveys are designed to acquire chart data in a rapid manner, so that a chart can be updated as quickly as possible.

Chart Evaluation Surveys (CES) are designed to resolve reported chart discrepancies or deficiencies, to evaluate the adequacy or accuracy of the chart, to acquire the data necessary for maintaining the chart in a current data status, and to assist in the determination of need for more extensive surveys.

Wire Drag Surveys are designed to investigate reported underwater obstructions and to assure that depths shallower than those found by basic surveys do not exist, or if they do exist, are located and a least depth determined.

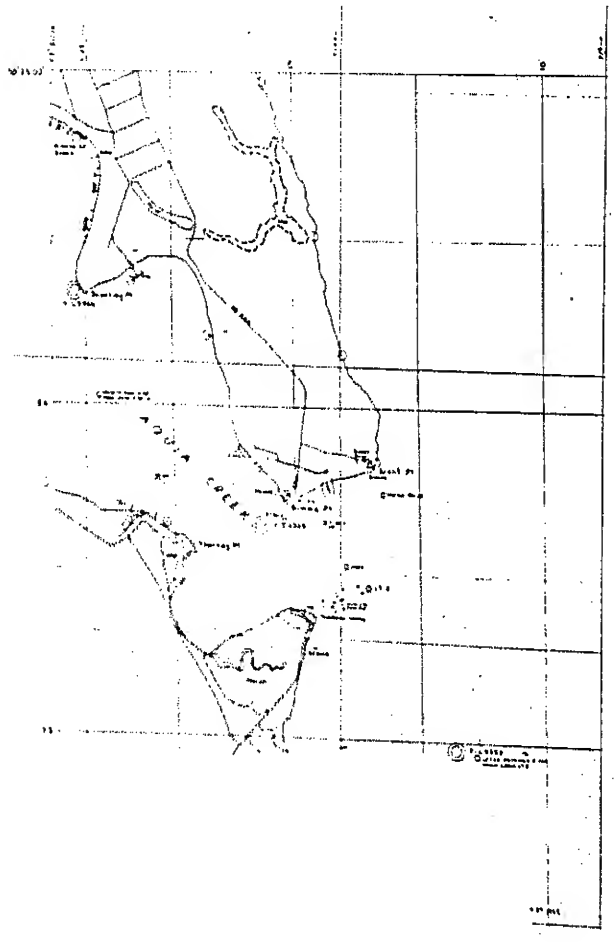


TOPOGRAPHIC SURVEYS AND PLANIMETRIC SHORELINE MAPS
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Ocean Service.

For orders and information, write or call: Data Control Section, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8408).



Topographic Surveys (Shoreline maps, topo sheets or T-sheets) are surveys of the land features of an area and limited in extent dictated by varying nautical chart requirements, generally to a distance of 1- to 10-kilometers inland from the shoreline. Topographic Surveys vary not only in coverage but also in content. Some may show only the shoreline and planimetric features immediately adjacent to the shoreline; others may be complete planimetric maps, covering the limits of the entire map; and still others may show contouring and spot elevations. The body of a Topographic Survey may contain the mean high water line, the sounding datum line, landmarks and aids to navigation, land contours and spot elevations, photobathymetry, onshore and offshore details, roads, railroads, buildings, marsh, swamp, streams, boundary lines, and numerous other planimetric features.

These Topographic Surveys along with Hydrographic Surveys have been used by NOS for the production and maintenance of nautical charts since 1835. Consequently, over 23,000 individual Topographic and Hydrographic Surveys are on file in the NOS archives. These surveys represent a unique and comprehensive record of the coastline and the adjacent waters, showing conditions existing on particular dates for more than a century and providing a detailed record of the changes that have occurred from both natural and artificial causes. Most of the Topographic Survey sheets have been compiled at scales of 1:10,000 or 1:20,000. A number of harbor areas have been completed at 1:5,000 scale.

DESCRIPTIVE REPORTS
Office of Charting and Geodetic Services

Issuance: As required.
Users: National Ocean Service.
For orders and information, write or call: Data Control Section, Hydrographic Surveys Branch, National Ocean Service, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8408).

A *Descriptive Report*, which accompanies most hydrographic and topographic surveys, serves as a narrative document describing the conditions under which the survey work was performed and discusses various factors affecting the adequacy and accuracy of the results. The report directs attention to important results of the survey and supplements the survey sheets and sounding records with additional information that cannot be shown clearly, concisely, or graphically on the sheets or in tabular form. The report also assists NOS cartographers in their functions of compilation and verification which are necessary to produce nautical charts from the data gathered during a survey. The report also serves to reference and index all records and other reports applicable to a survey and to give in concise form required information on certain standard subjects, such as the area surveyed, the control stations, the aids to navigation, and the geographic names list.

Diagram No. 369-5 & 1215-3

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. WH-10-2-79

Office No. H-9859

LOCALITY

State NEW YORK

General Locality NEW YORK HARBOR

Locality ~~LOWER BAY~~ Norton Point TO THE NARROWS

1979 - 80

CHIEF OF PARTY
CDR. K. W. KIENINGER & CDR. F. P. ROSSI

LIBRARY & ARCHIVES

DATE Oct. 27, 1981

There are four deficiences on the current shoreline manuscripts noted by the present survey which are as follows:

1. The Landfill area in the vicinity of Latitude 40°35.48', Longitude 74°00.02',
2. The Landfill area in the vicinity of Latitude 40°35.42', Longitude 74°59.96',
3. The pier at Latitude 40°36.49', Longitude 74°02.16'
4. The outfall under construction at Latitude 40°36.73', Longitude 74°06.56'.

All of these deficiencies are discussed in section 7 of this report with the exception of the outfall which is recommended to be charted as defined by the present survey.

3. Hydrography

a. Depths at crossings are in good agreement.

b. Depth contours were drawn at the standard intervals. The supplemental 36-foot contour was added for additional delineation of deep water navigational areas. Brown curves were added to portray features not apparent from standard and supplemental contours.

c. The development of the bottom configuration and investigation of least depths is considered adequate with the following exceptions:

1) The development of Coney Island Creek is not considered sufficient to delineate the bottom configurations.

2) The shoal in the vicinity of Latitude 40°36.45', Longitude 74°02.27' with present survey depths of 11 feet is not considered sufficiently developed to verify or disprove a charted 10-foot shoal in the area.

3) A six-foot shoal found by the present survey at Latitude 40°36.86', Latitude 74°03.36' is not considered sufficiently developed to ascertain that the least depth was obtained.

4) Shoaling of 7 to 9 feet found by the present survey in the vicinity of Latitude 40°36.42', Longitude 74°02.15' is not considered sufficiently developed to verify or disprove a charted 6-foot shoal in the area.

4. Condition of Survey

The soundings records, smooth sheet and accompanying overlays, hydrographic records, and Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual with the following exceptions:

a. Bar checks were not as frequent as prescribed in section 1.5.2. of the Hydrographic Manual. Seventeen out of a possible fifty-two bar checks were taken, also only two T.H.C. casts were made.

b. The Geographic Names List was not complete as prescribed in section 5.1.5. of the Hydrographic Manual.

Cover of a Descriptive Report and data entries.

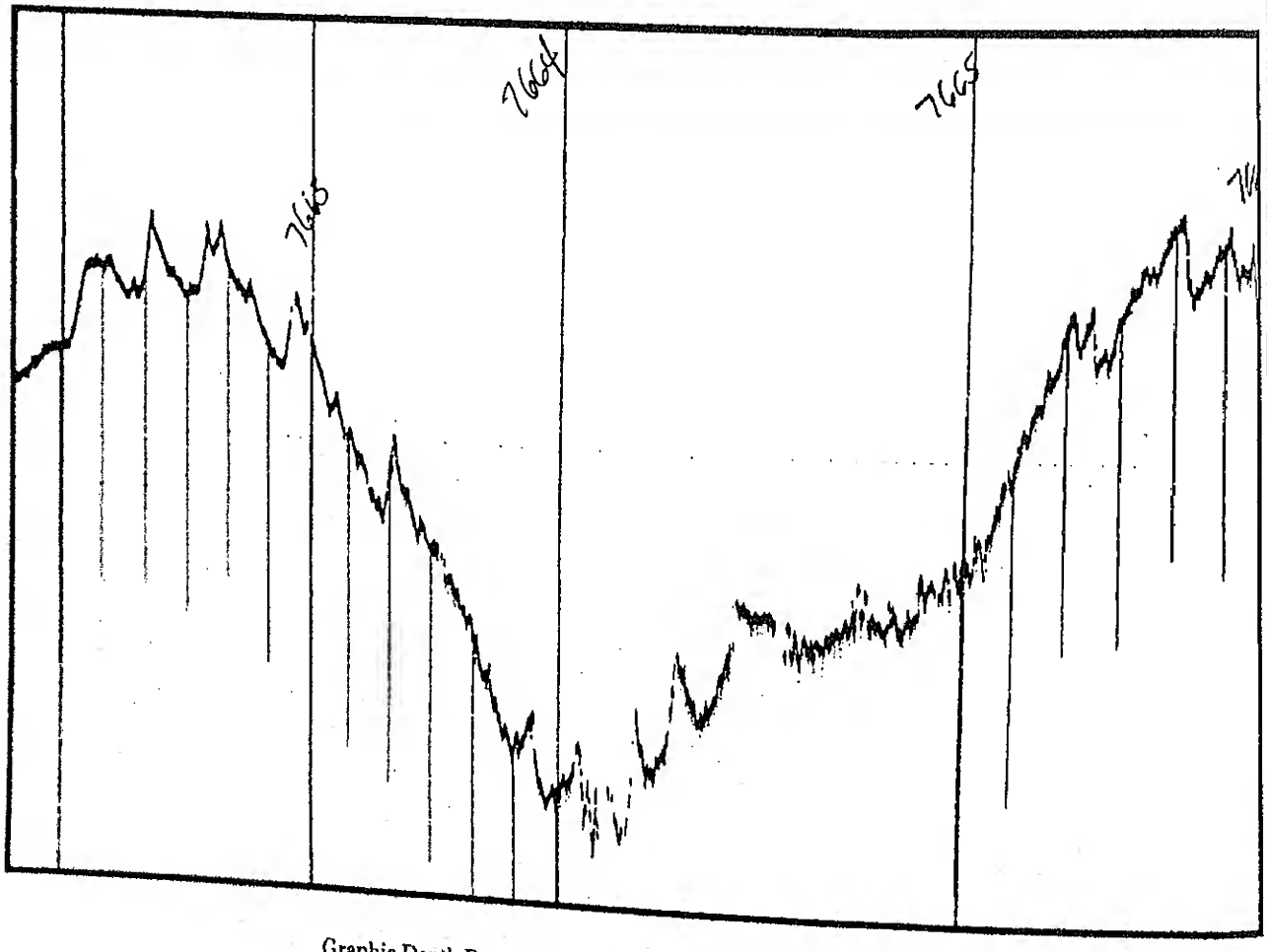
GRAPHIC DEPTH RECORDS (ECHOGRAMS)
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Ocean Service.

For orders and information, write or call: Hydrographic Surveys Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8231).

Graphic Depth Records, the official field records of soundings for manually recorded surveys, are permanent graphic or analog records of the bottom profile produced by the echo sounders used in NOS hydrographic surveys. NOS has, since World War II, accumulated an enormous volume of continuous depth profiles, representing virtually every sounding line on every survey. A large amount of this collected information is available only in the original graphic form. However, because of the difficulties inherent in making useable copies of these records, it is preferred that interested parties make arrangements well in advance for viewing the originals in Rockville, Md.



Graphic Depth Record for a portion of San Francisco Bay.

SOUNDING VOLUMES

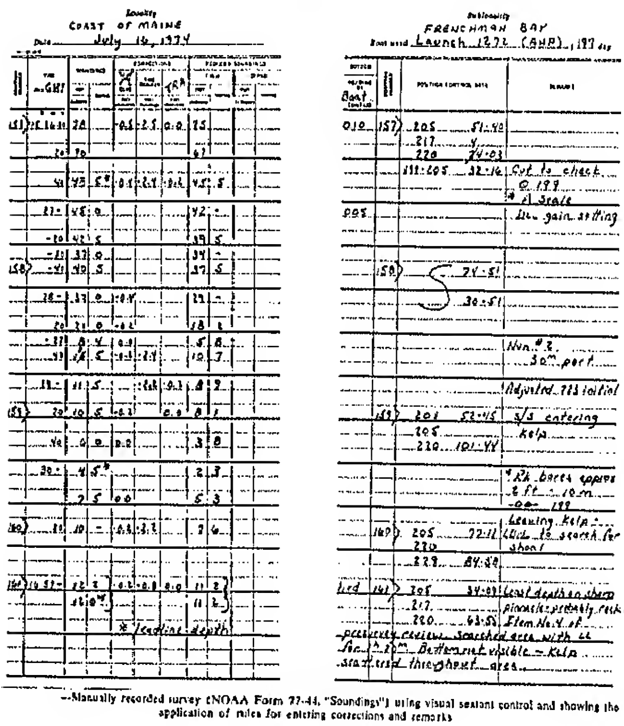
Office of Charting and Geodetic Services

Issuance: As required.

Users: National Ocean Service.

For orders and information, write or call: Hydrographic Surveys Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8408).

Sounding Volumes include raw soundings hand-recorded from hydrographic surveys performed mostly before 1964; necessary correctors to reduce the depth to the sounding datum; and fixed values used to determine the position of the vessel. All data in the volumes are recorded by time, day, and position number and referenced to a hydrographic survey sheet; i.e., position numbers in the *Sounding Volumes* can be identified with position numbers shown on the hydrographic sheet. Sounding Volumes have been supplemented increasingly by flexowriter or teletype printouts since 1964 when automatic data acquisition was initiated in the field and began to replace the former method of hand-recording in bound volumes. Virtually all records of hydrographic data today are in flexowriter or teletype printout form; however, soundings of an automated hydrographic survey can still be related by position number to the raw data printouts.


HYDROGRAPHY

Locality COAST OF MAINE

Date July 16, 1974

Sublocality FRENCHMAN BAY

Boat used Launch 1271 (AHB), 1974

—Manually recorded survey (NOAA Form 77-44, "Soundings") using visual sextant control and showing the application of rules for entering corrections and remarks

(JULY 4, 1976)

Page from a Sounding Volume.

AUTOMATED WRECK AND OBSTRUCTION INFORMATION SYSTEM

Office of Charting and Geodetic Services

Issuance: As requested.

Users: National Ocean Service survey planners, commercial salvagers, scuba divers, and private researchers.

For information, write or call: Hydrographic Surveys Branch, Office of Charting and Geodetic Services, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8752).

The Automated Wreck and Obstruction Information System is an automated file which contains information relative to wrecks and obstructions in areas subject to NOS hydrographic survey. Items in the file are individually catalogued and are accompanied by historic and descriptive information gathered from field observations and Government and private publications. All items have a position in latitude and longitude, a position accuracy code, a charted symbol code, and a chart number. Each item has also been evaluated for the adequacy of the available information as it relates to future survey and nautical charting activities and may carry a specific recommendation for the type of survey investigation required to improve the quality of known information.

```
SILVER SPRAY          000000 41 48 2839N 087 35 0125W Y 330098 *1 14900

 HISTORY
   I2232/64
   CES 14926--OPR-Y411-HSB-80, ITEM 3; INVESTIGATED 6/20/80, BOILER EXPOSED
    0.7 FT AT LWD, MEASURES 5 X 10 FT., REMAINS OF VESSEL SILVER SPRAY, SUNK
    1914, WOODEN HULLED PASS. STMR; MARINE POLICE SAY NEVER OBSERVED BOILER
    EXPOSED AND CONSIDER IT A DANGEROUS OBSTRUCTION, LOCALLY KNOWN TO BOATERS
    AND REFERRED TO AS, THE BOILER; A DIVER INVESTIGATION FAILED TO FIND ANY
    ADDITIONAL REMAINS OF WRECK; POS. DETERMINED BY R/AZ.

 DESCRIPTION
    26 PASS STEAMER, 109 FT L, 22 FT W, 8.3 FT D; SUNK 1914 ON CHICAGO LAKEFRONT
       WOOD HULL GONE, BOILER, PROP SHAFT, SMALL TANK REMAIN AS OF REPORT DATE
       OF 1/62; COE CONSIDERED REMOVAL UNNECESSARY SINCE IN SHALLOW, ROCKY AREA
       SUBSEQUENTLY STRUCK BY PRIVATE VESSEL WITH EXTENSIVE DAMAGE, RESULTING
       IN CIVIL ACTION 62 C 1364 AGAINST USA, REPORTED POSITION WAS
       LAT. 41-48-28.39N, LONG. 87-35-01.25W.

 SURVEY REQUIREMENTS
  FULL; STATUS CHECK
```

Wreck file data for the steamer SILVER SPRAY.

COASTAL MAPPING HANDBOOK 1978
Office of Charting and Geodetic Services

Issuance: Once only.

Users: Engineering and planning agencies and academia.

For orders and information, write or call: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202-783-3238).

The *Coastal Mapping Handbook, 1978,* was designed to help planners and managers of coastal programs in determining their mapping requirements, selecting the best maps and charts for their particular needs, and communicating effectively with personnel who gather data and prepare maps.

A HISTORY OF FLYING AND PHOTOGRAPHY IN THE PHOTOGRAMMETRY DIVISION OF THE NATIONAL OCEAN SURVEY, 1919-79.
Office of Charting and Geodetic Services

Issuance: Once only.

Users: Developers of photogrammetry techniques and historians.

For orders and information, write or call: Photogrammetry Branch, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8744).

A History of Flying and Photography in the Photogrammetry Division of the National Ocean Service, 1919-79 is comprehensive and extensively illustrated. It provides background data for future developments in the field through the detailing of the numerous, and sometimes colorful, successes and failures encountered regularly by the Division's dedicated personnel, who through the years strived to realize the full potential of this technically productive field. This history also describes the many

AERONAUTICAL CHARTING SERVICES

The National Ocean Service compiles the aeronautical charts required for safe flight in the National Airspace System. Aeronautical charts and related publications are the primary means of providing users of the National Airspace System with a graphic and narrative description of U.S. airways, navigation facilities, airports, arrival and departure procedures, safe operating procedures, air traffic rules and regulations, and services offered by the air traffic control system in the form most suitable for operational use.

Most of the NOS aeronautical publications are prepared by the NOS Office of Charting and Geodetic Services, Aeronautical Charting Division, which also directs the Survey's reproduction facility where nautical, aeronautical, and related publications are printed. This facility engages in and utilizes all processes for making lithographic copy from manuscript, which include negative engraving, type composition, photographic processes, plate making, multi-color press printing, and finishing (bindery) operation.

The Aeronautical Charting Division also plans and directs the distribution of all NOS charts and related publications to other Government agencies, sales agents, and the general public. These charts and publications include nautical and aeronautical products produced by NOS and certain charts printed by the U.S. Defense Mapping Agency Aerospace Center.

The Air Commerce Act of 1926 marked the beginning of a comprehensive and organized effort to regulate air commerce. In the Act, the Secretary of Commerce was authorized to provide accurate charts for air navigation. The Act also defined the relationship between the agency that establishes the air navigation facilities and manages the National Airspace System, the Federal Aviation Administration—FAA, and the agency that produces the required charts and related graphics—NOS. The FAA determines operational requirements for aeronautical charts and publications and identifies coverage, content, and standards of material to be used for operating in the National Airspace System. In turn, NOS supports and assists the FAA in the production aspects of the chart design and program development. NOS compiles, prints, and distributes aeronautical charts and engages in the development of advanced cartographic techniques and design.

The aeronautical charts produced by NOS serve the needs of aviation in the United States and are sold by subscription to users among the more than 800,000 civilian pilots in private and commercial aviation. NOS provides aeronautical charts to the U.S. Defense Mapping Agency Aerospace Center for some domestic military requirements. In addition, special aeronautical charts, chart supplements, and data are provided for the use of FAA air traffic controllers in managing the National Airspace System. NOS and its predecessor agency, the U.S. Coast and Geodetic Survey, have produced these aeronautical products since the birth of civil aviation.

VISUAL FLIGHT RULES/INSTRUMENT FLIGHT RULES (VFR/IFR) WALL PLANNING CHART

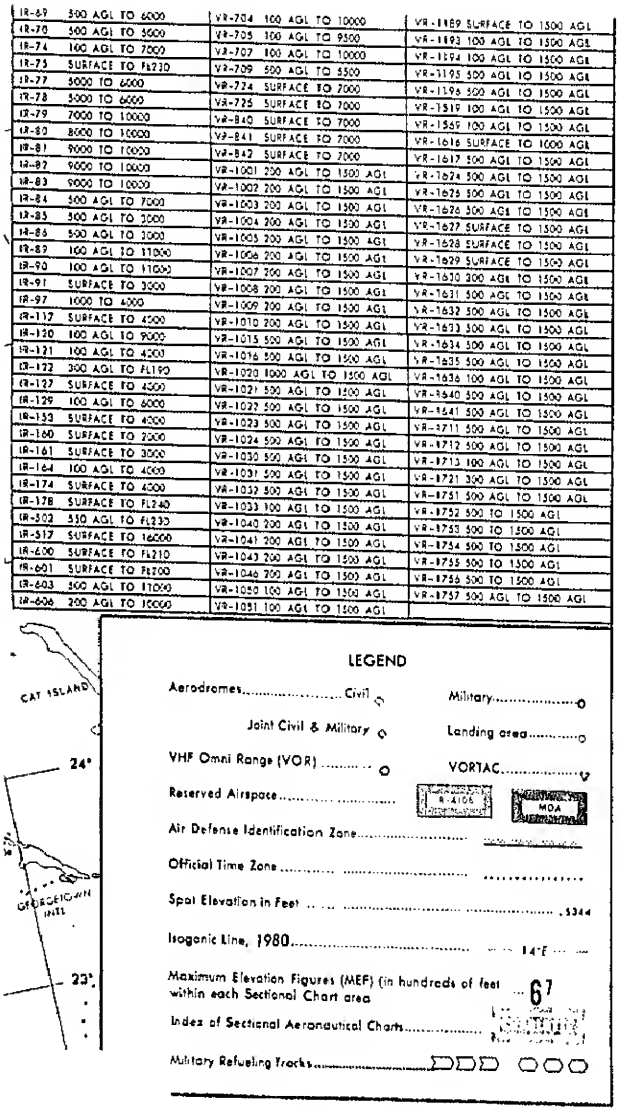
Office of Charting and Geodetic Services

Issuance: Every 56 days.

Users: Airport planning staff and pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

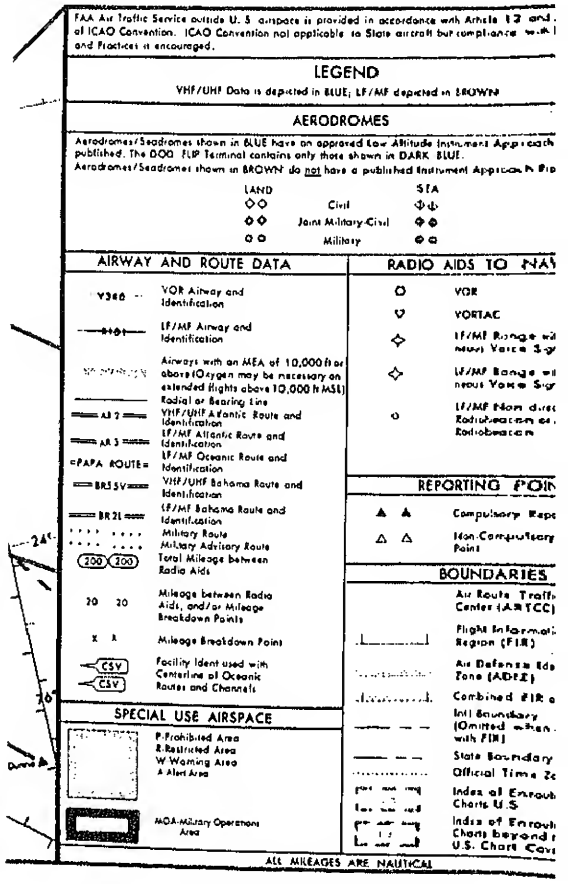
The VFR/IFR Wall Planning Chart, which is in two parts, is assembled to form a composi *Wall Planning Chart* on one side and an *IF Planning Chart* on the other. The chart is at of 1:32 nautical miles and measures 82″ x 56′ mation on the IFR side of the chart includes tude airways and mileages, navigational fa special use airspace areas, time zones, airpor tary training routes, and related data. Info on the VFR side of the chart includes select ulation places, bodies of water, major drainag ed relief, navigational facilities, airports, spe airspace areas, military routes, isogonic lines, a ed data. *VFR/IFR Wall Planning Charts* can be flat or folded.



VFR WALL
NING CHART (EAST)

62nd Edition March 18, 1982

IFR WALL PLANNING CHART (WEST)



UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION

IFR WALL PLANNING CHART –
LOW ALTITUDE – U.S.

For use up to but not including 18,000′ MSL

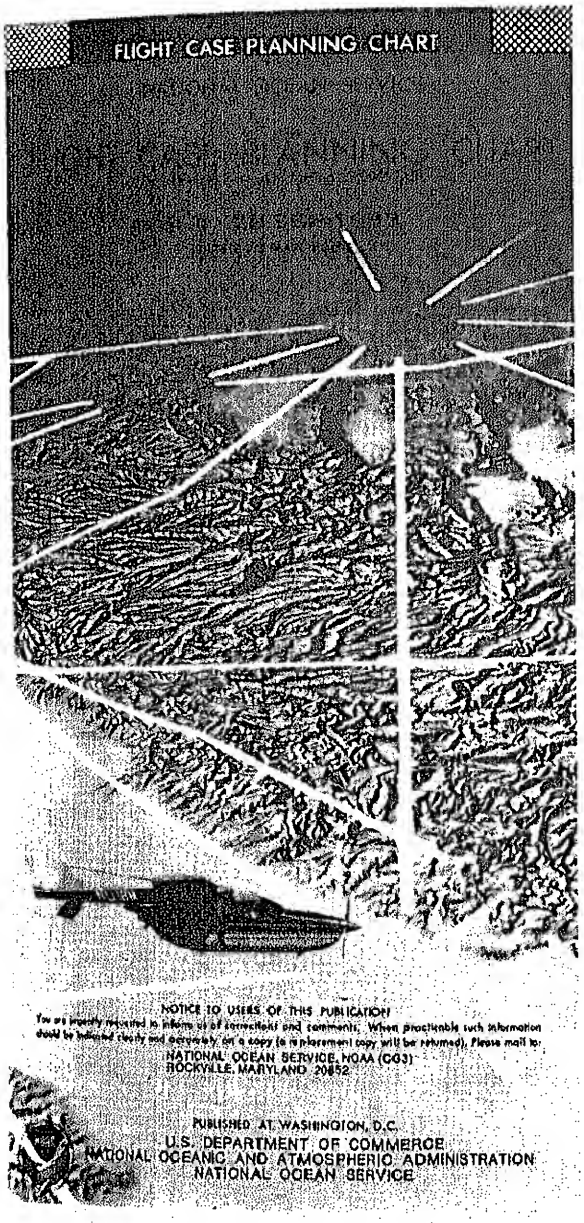
EFFECTIVE 0901Z 18 MAR 1982
TO 0901Z 13 MAY 1982

Scale 1″ = 32 NM

Lambert Conformal Conic Projection Standard Parallels 33° and 45

FLIGHT CASE PLANNING CHART
Office of Charting and Geodetic Services

Issuance: Every 24 weeks.
Users: Airport planning staffs and pilots.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).



The *Flight Case Planning Chart*, designed for preflight and enroute flight planning for Visual Flight Rules (VFR), contains basically the same information as the *Visual Flight Rules/Instrument Flight Rules (VFR/IFR) Wall Planning Chart*, with the addition of selected Flight Service Stations and Weather Service Offices located at airport sites; parachute jumping areas, a tabulation of special use airspace areas, a mileage table listing distances between 174 major airports, and a city and airport location index. The chart is at a scale of 1″ equals 60 nautical miles, measures 30″ x 50″, and can be ordered flat or folded.

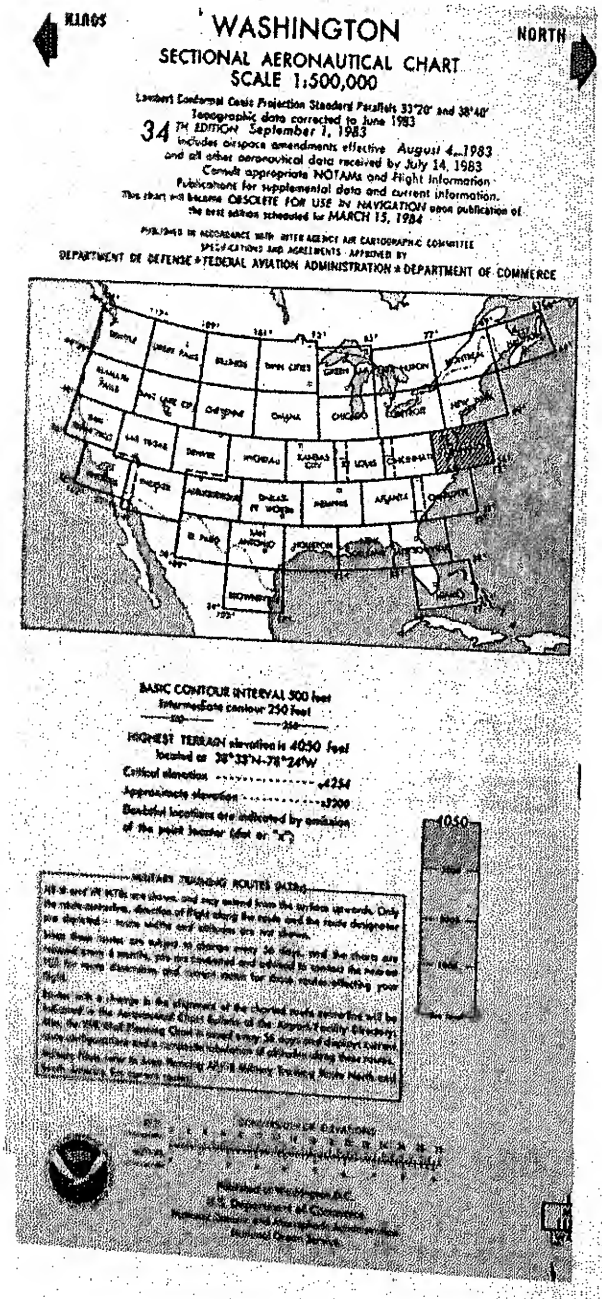
SECTIONAL AERONAUTICAL CHARTS
Office of Charting and Geodetic Services

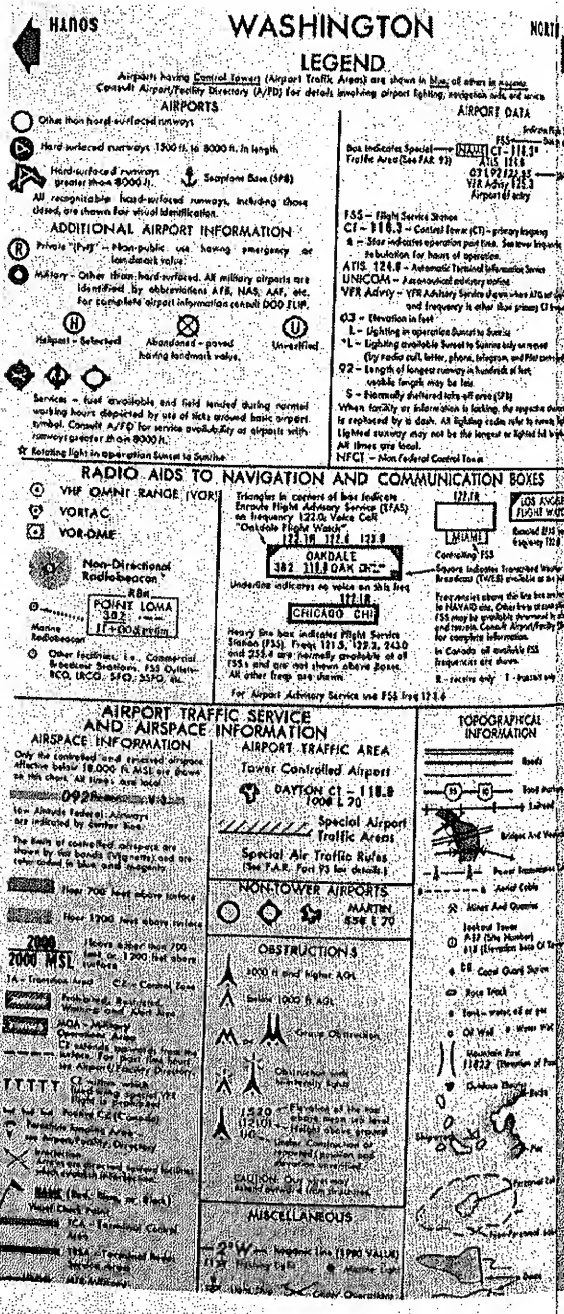
Issuance: Semiannually.

Users: Pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Sectional Aeronautical charts, designed for visual na gation of slow- and medium-speed aircraft, prov complete coverage of the United States. Aeronauti data portrayed on the charts include visual and ra aids to navigation; aerodromes; controlled airspac restricted areas; obstructions; and related informati The charts indicate topographic information, incl ing relief features, together with a selection of vis check points of Visual Flight Rule (VFR) flight. T latter includes population places, drainage, roads, r roads, and other distinctive landmarks. The cha are produced at a scale of 1:500,000 and can be orde flat or folded.





VISUAL FLIGHT RULES (VFR) TERMINAL AREA CHARTS

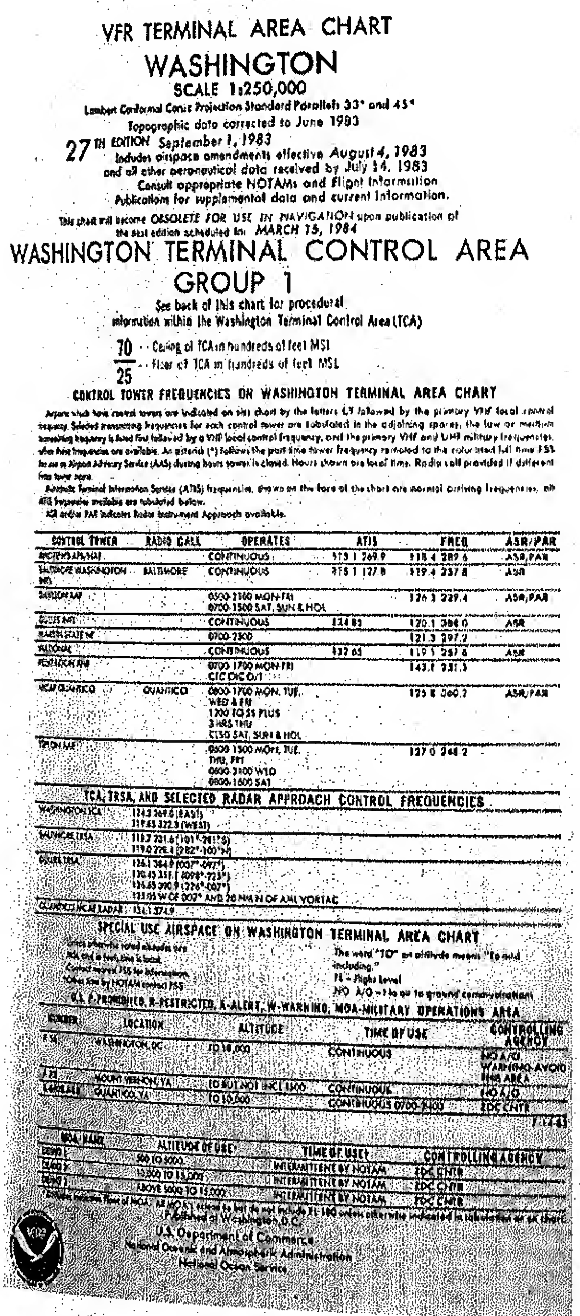
Office of Charting and Geodetic Services

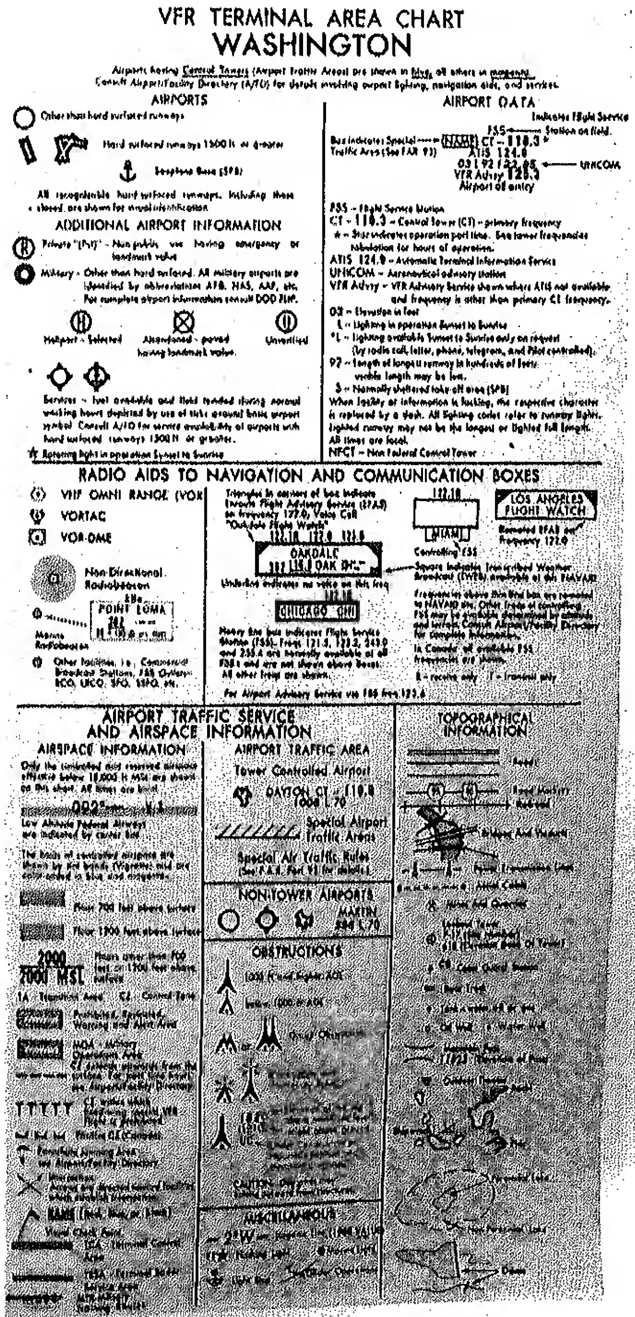
Issuance: Semiannually.

Users: Pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

VFR Terminal Area Charts depict the airspace designated as "Terminal Control Area" and provide the control or segregation of all aircraft within the Terminal Control Area. Other information includes visual and radio aids to navigation; aerodromes; restricted areas; obstructions; and related data. The charts also indicate topographic information and feature the portrayal of relief and a selection of visual check points of VFR flight. The visual check points include population places, drainage, roads, railroads, and other distinctive landmarks. The charts are produced at a scale of 1:250,000.

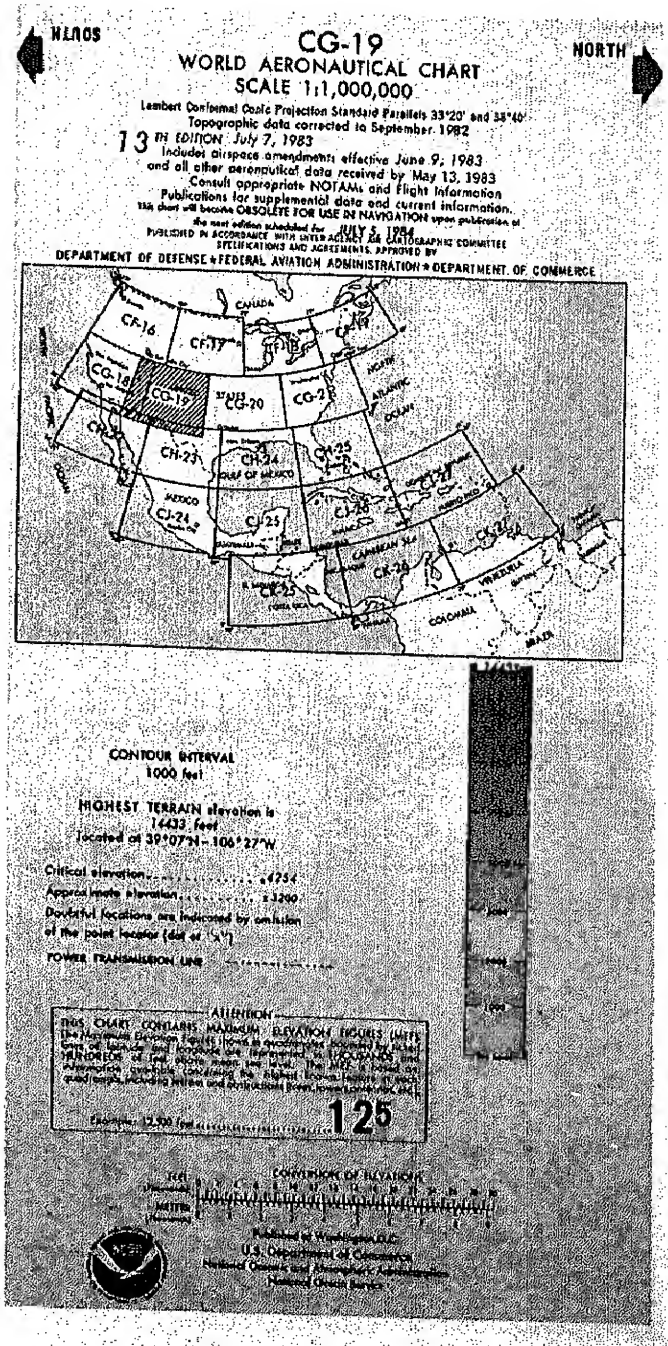


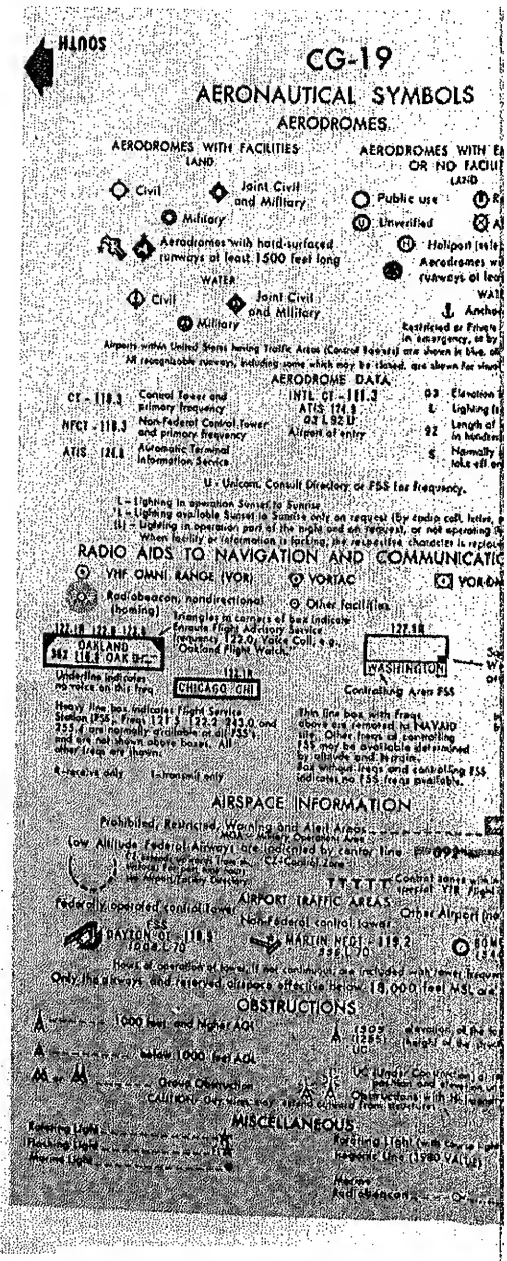


WORLD AERONAUTICAL CHARTS (WAC)
Office of Charting and Geodetic Services

Issuance: Annually (with exceptions).
Users: Pilots.
For orders and information, write or call: Distribution Branch, NOAA, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

World Aeronautical Charts, compiled
standard series of aeronautical charts, cov
at a size and scale convenient for navigat
erate speed aircraft. The information c
each chart includes topography, cities and
cipal roads, railroads, distinctive landmar
and relief. The relief is shown by spot ele
tours, and gradient tints. Aeronautical
includes visual and radio aids to navig
dromes, airways, restricted areas, and
NOS coverage includes the conterminous U
Alaska, Mexico, and the Caribbean. Ad
erage, *Operational Navigation Charts*, is a
the U.S. Defense Mapping Agency Aeros
The charts are produced at a scale of 1:1,00





U.S. GULF COAST (VFR) AERONAUTICAL CHART

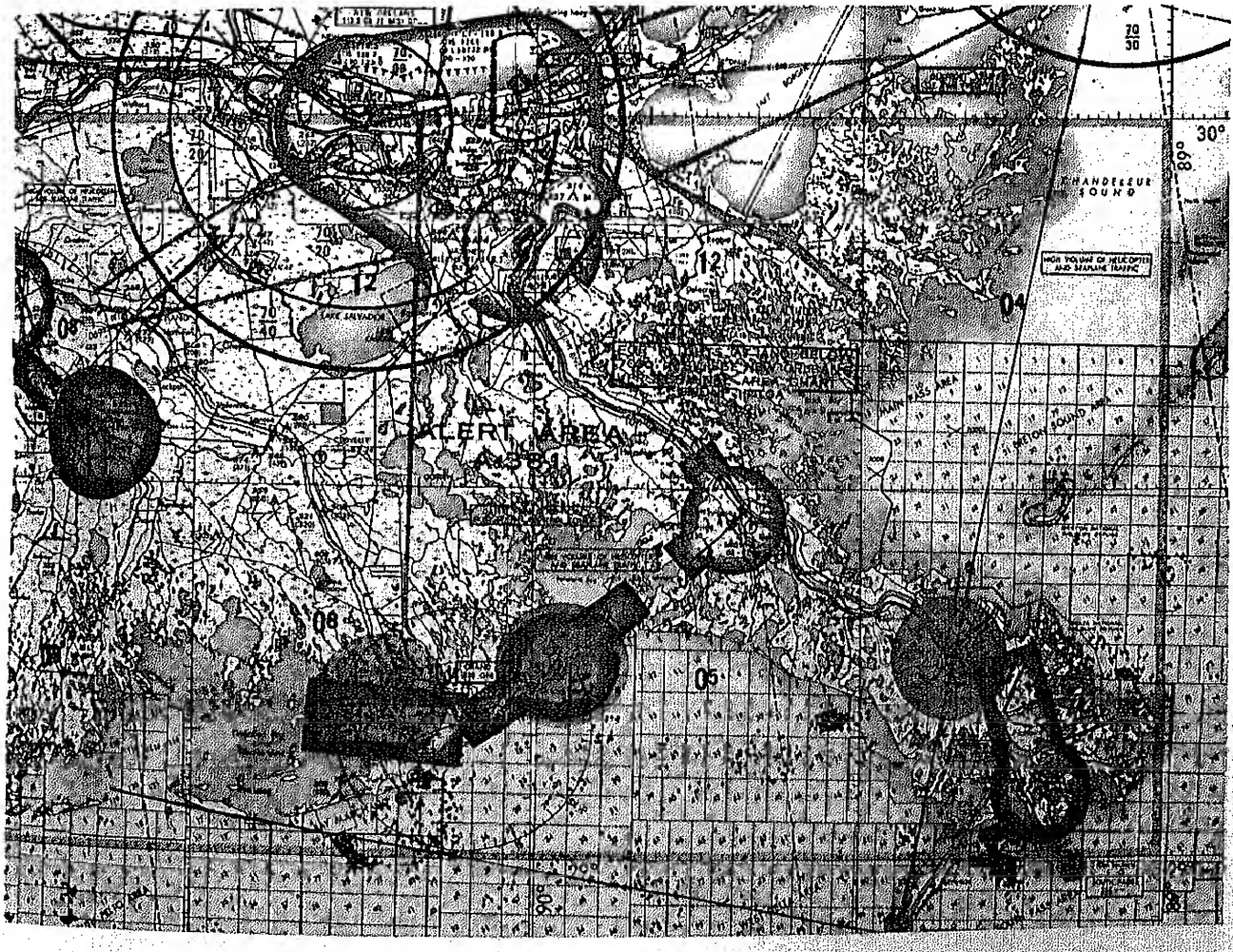
Office of Charting and Geodetic Services

Issuance: Annually (or as needed).

Users: Oil drilling contractors; Federal Aviation Administration's planning staff; and private and commercial helicopter pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

U.S. Gulf Coast VFR Aeronautical Charts are designed for and used in the U.S. Gulf coastal region because of the area's extensive helicopter traffic. The land coverage includes portions of and many details shown on four of NOS' Sectional Aeronautical Charts: Brownsville, San Antonio, Houston, and New Orleans. The water portion includes the U.S. Bureau of Land Management's mineral leasing area grid blocks, identified by oil rigs, platforms, and number. These charts are produced at a scale of 1:500,000.



U.S. Gulf Coast VFR Aeronautical Chart, 2nd edition.

VISUAL FLIGHT RULES (VFR) HELICOPTER CHART

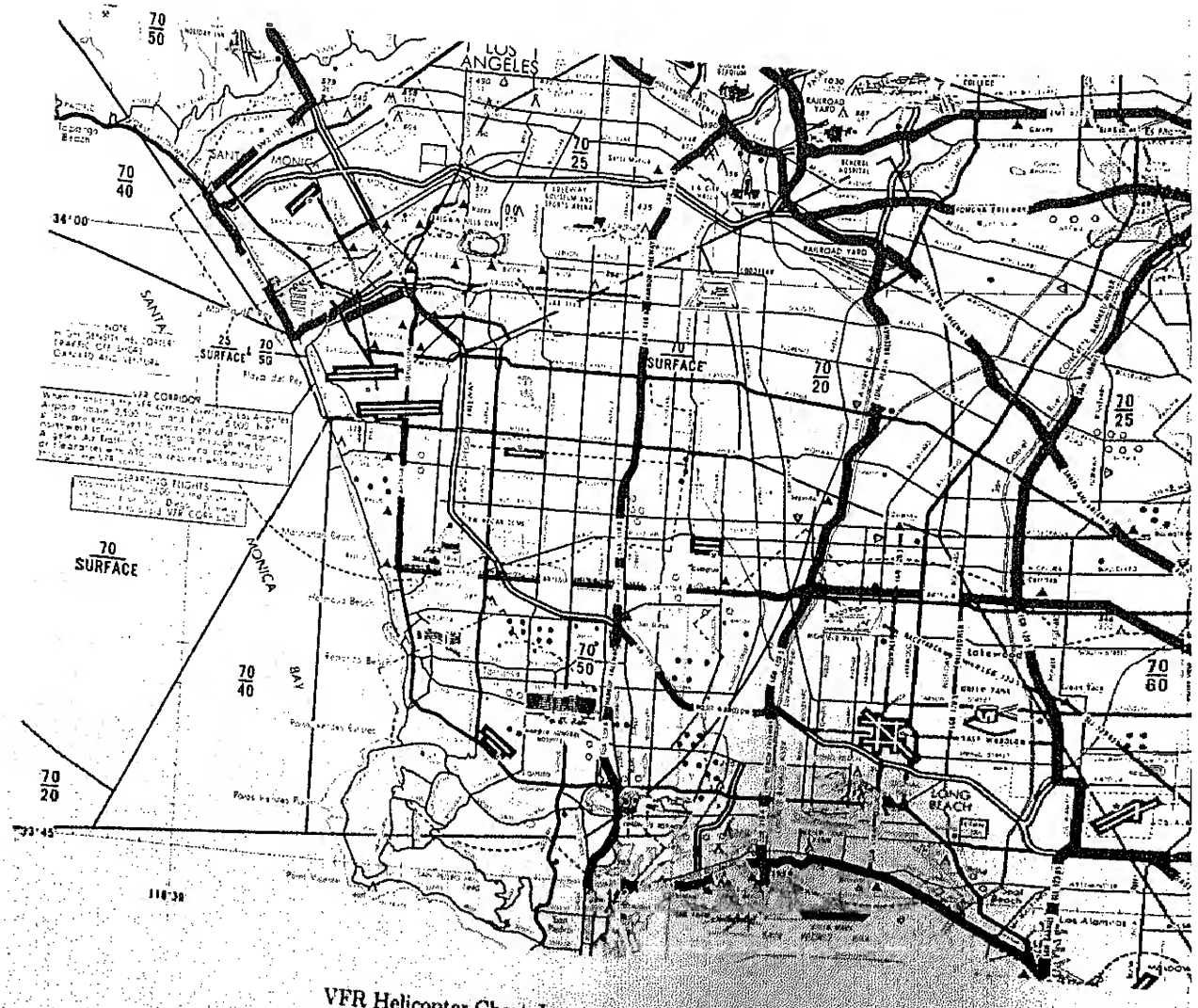
Office of Charting and Geodetic Services

Issuance: As required.

Users: Private and commercial helicopter pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

VFR Helicopter Charts contain selected top information, with specified routes and assoc required by the air conditions in which a pilot helicopter under Visual Flight Rule conditio time, Los Angeles and vicinity at a scale of is the only VFR Helicopter Chart produced.



VFR Helicopter Chart, Los Angeles and Vicinity, 5th edition.

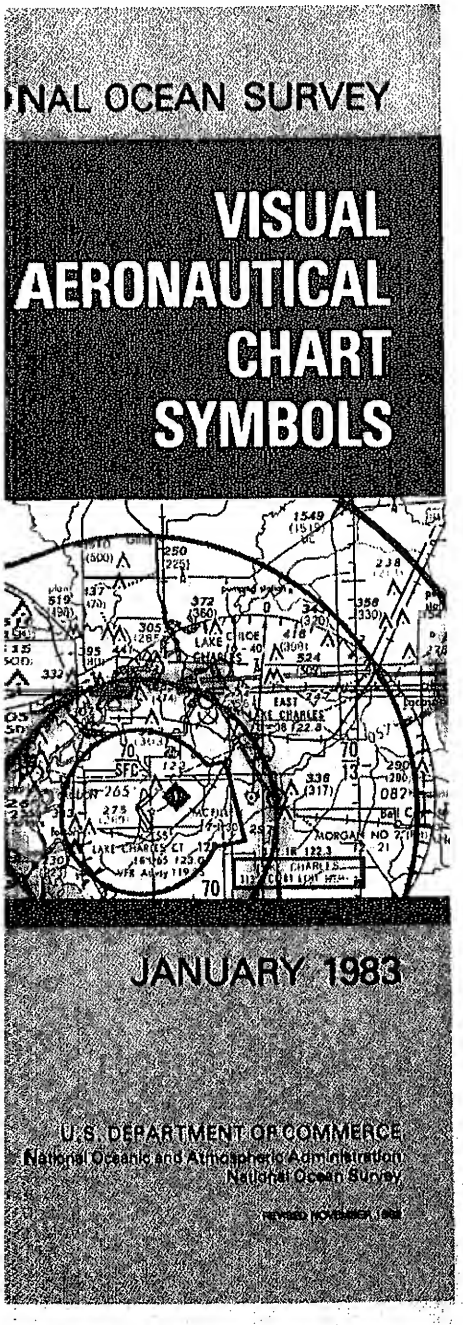
›NAUTICAL CHART SYMBOLS
ɪrting and Geodetic Services

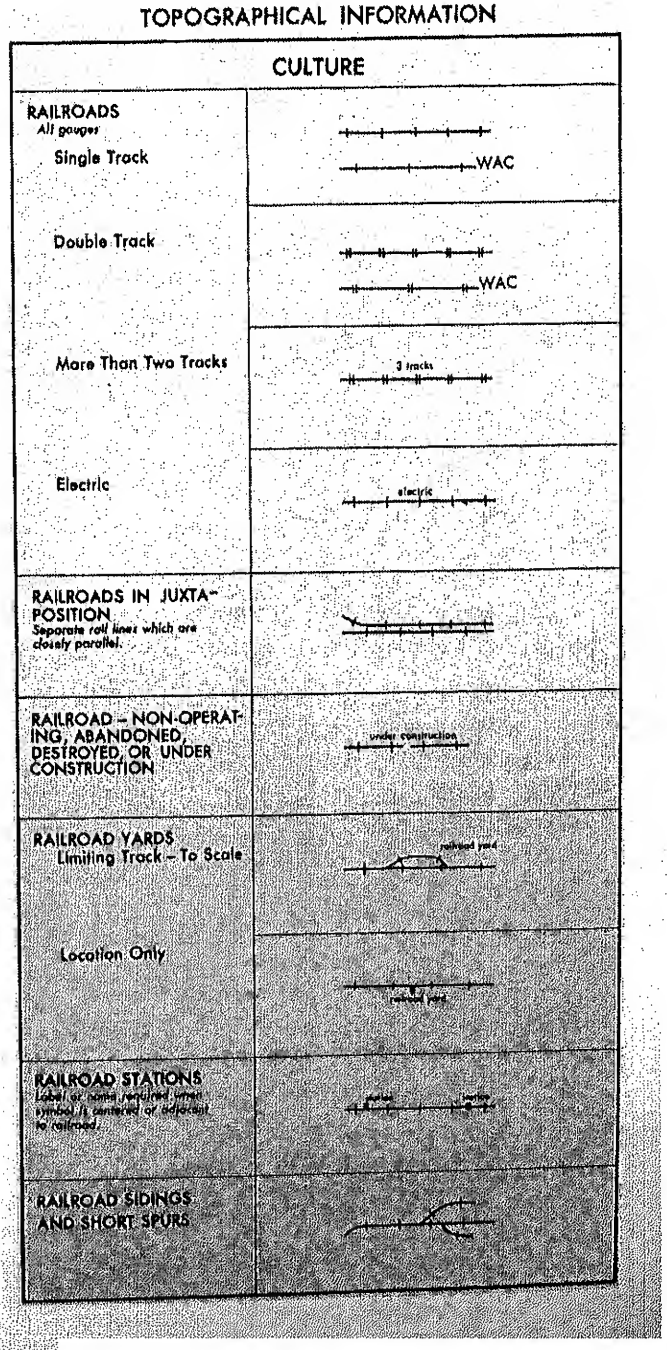
quired.

ɹnd commercial pilots.

ɗ information, write or call: Dis-
:h, National Ocean Service, NOAA,
ɔ737 (301-436-6990).

Visual Aeronautical Chart Symbols, a booklet prepared by NOS, shows the topographic and aeronautical symbols approved for use in compiling World Aeronautical Charts, Sectional Aeronautical Charts, and Visual Flight Rules (VFR) Terminal Area Charts.





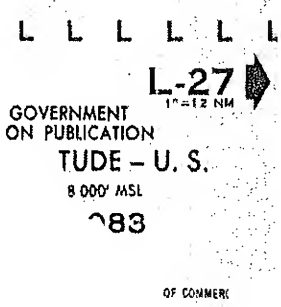
ENROUTE LOW ALTITUDE CHARTS
Office of Charting and Geodetic Services

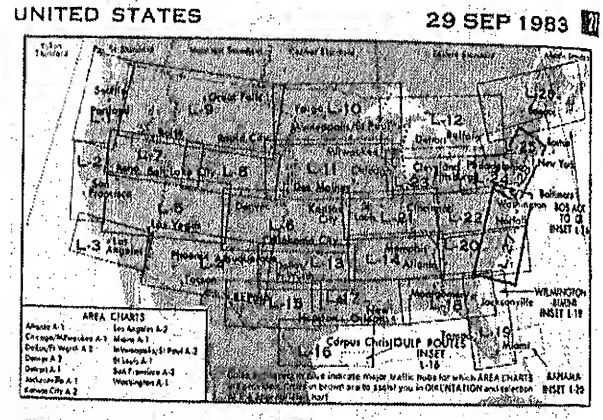
Issuance: Every 56 days.

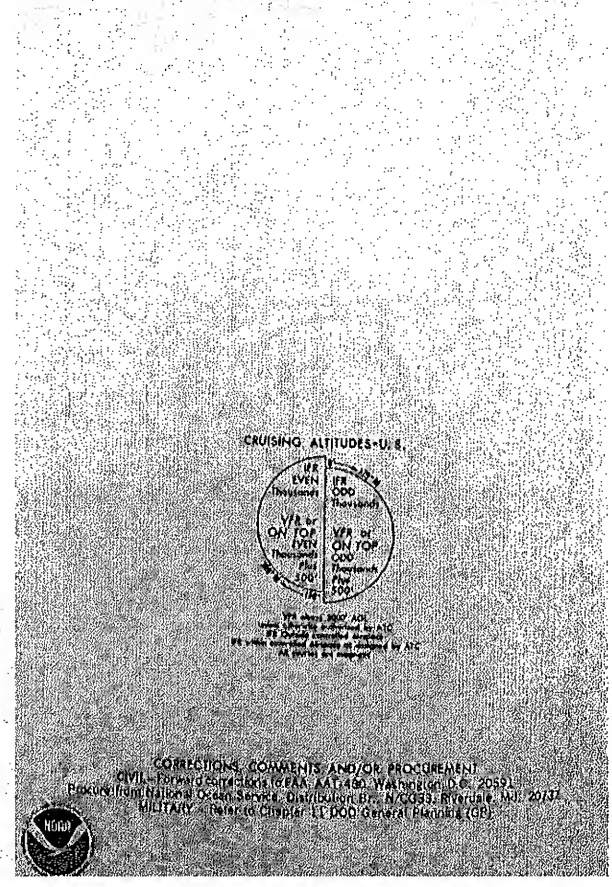
Users: Military, commercial, and general aviation pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Enroute Low Altitude Charts* provide aeronautical information for enroute instrument navigation (Instrument Flight Rules) in the low altitude stratum. Information portrayed includes low and medium frequency and very high frequency airways; limits of controlled airspace; position, identification, and frequencies of radio aids; selected aerodromes; minimum enroute and obstruction clearance altitudes; airway distances; reporting points; special-use airspace areas; military training routes; and related information. The chart scales range from 1″ equals 8 nautical miles to 1″ equals 20 nautical miles.







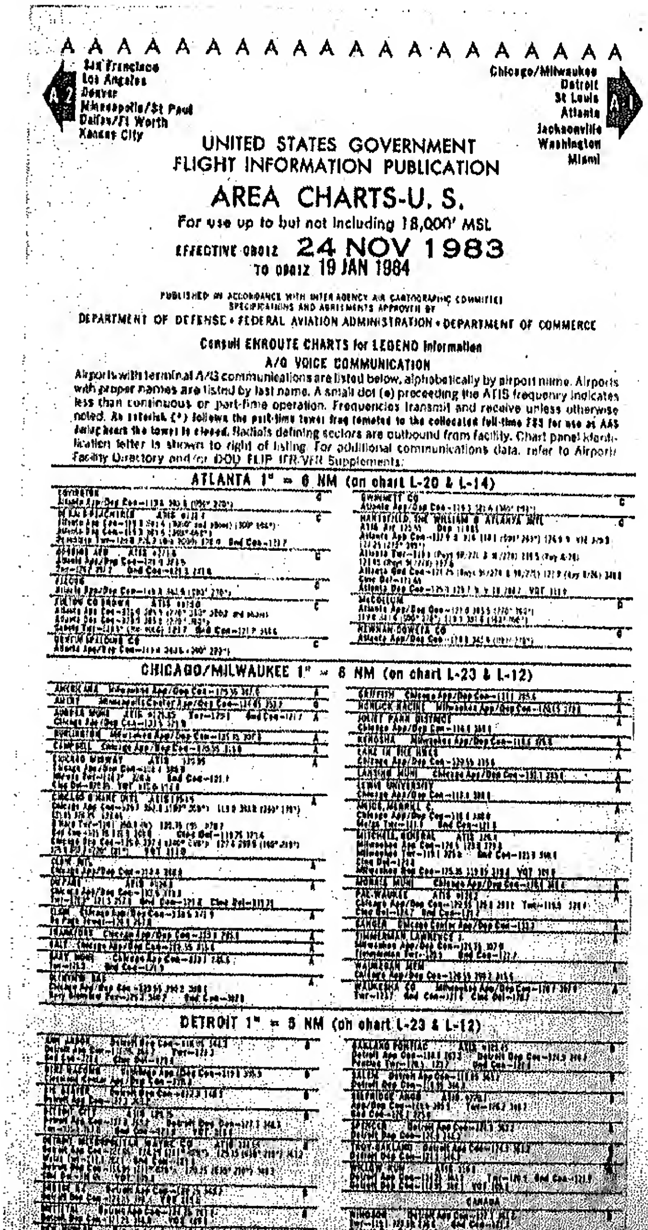
ENROUTE LOW ALTITUDE AREA CHARTS
Office of Charting and Geodetic Services

Issuance: Every 56 days.

Users: Military, commercial, and general aviation pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Enroute Low Altitude Area Charts are special *Enroute Low Altitude Charts* with the addition of terminal data at a larger scale in congested areas. Information contained in the chart includes aeronautical data for enroute navigation (Instrument Flight Rules) in the low altitude stratum; low and medium frequency and very high frequency airways; limits of controlled airspace; position, identification, and frequencies of radio aids; selected aerodromes; minimum enroute and obstruction clearance altitudes; airway distances; reporting points; special-use airspace areas; military training routes; and related information. The chart scales range from 1″ equals 5 nautical miles to 1″ equals 8 nautical miles.



A A A A A A A A A A A A A A A A A A A A

A-2 San Francisco, Los Angeles, Denver, Minneapolis/St Paul, Dallas/Ft Worth, Kansas City

A-1 Chicago/Milwaukee, Detroit, St Louis, Atlanta, Jacksonville, Washington, Miami

UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION

AREA CHARTS-U. S.

For use up to but not including 18,000′ MSL

EFFECTIVE 0901Z 24 NOV 1983
TO 0901Z 19 JAN 1984

PUBLISHED IN ACCORDANCE WITH INTER AGENCY AIR CARTOGRAPHIC COMMITTEE SPECIFICATIONS AND AGREEMENTS APPROVED BY
DEPARTMENT OF DEFENSE • FEDERAL AVIATION ADMINISTRATION • DEPARTMENT OF COMMERCE

Consult ENROUTE CHARTS for LEGEND Information

A/G VOICE COMMUNICATION

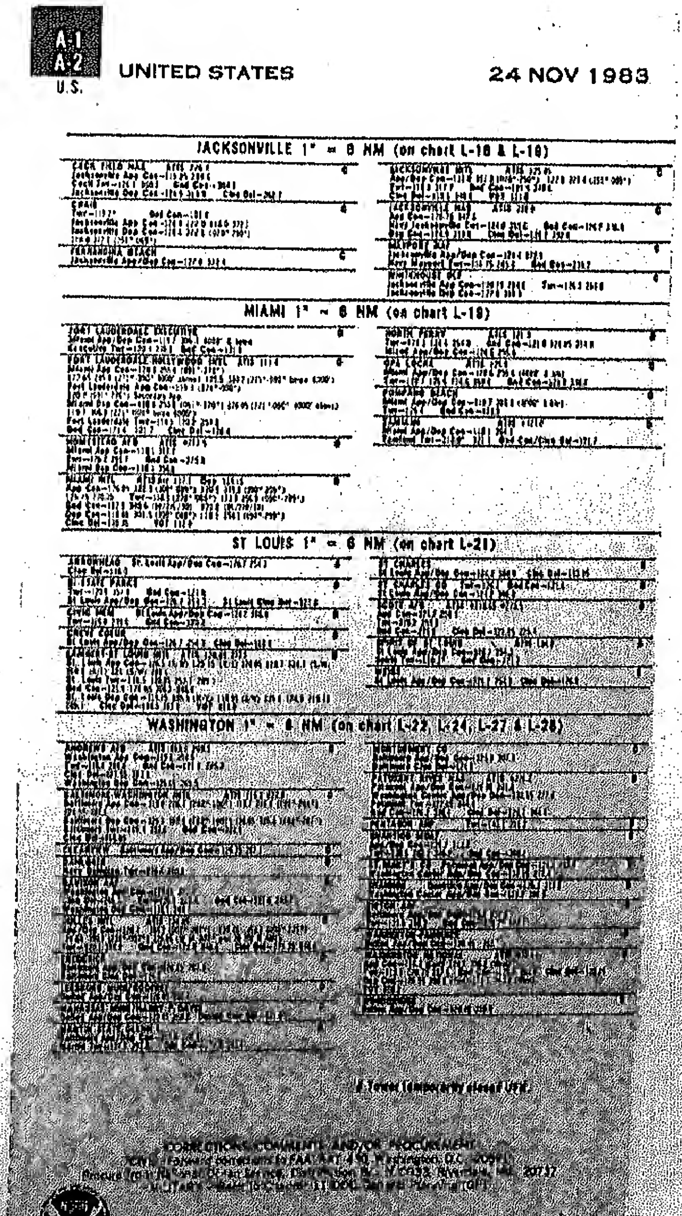
Airports with terminal A/G communications are listed below, alphabetically by airport name. Airports with proper names are listed by last name. A small dot (•) preceeding the ATIS frequency indicates less than continuous or part-time operation. Frequencies transmit and receive unless otherwise noted. An asterisk (*) follows the part-time tower freq remoted to the collocated full-time FSS for use as AAS when the tower is closed. Radials defining sectors are outbound from facility. Chart panel identification letter is shown to right of listing. For additional communications data, refer to Airport/Facility Directory and/or DOD FLIP IFR-VFR Supplements.

ATLANTA 1″ = 6 NM (on chart L-20 & L-14)

CHICAGO/MILWAUKEE 1″ = 6 NM (on chart L-23 & L-12)

DETROIT 1″ = 6 NM (on chart L-23 & L-12)

CANADA



A-1 A-2 U.S. UNITED STATES 24 NOV 1983

JACKSONVILLE 1″ = 6 NM (on chart L-18 & L-19)

MIAMI 1″ = 6 NM (on chart L-19)

ST LOUIS 1″ = 6 NM (on chart L-21)

WASHINGTON 1″ = 6 NM (on chart L-22, L-24, L-27 & L-28)

CORRECTIONS, COMMENTS, AND/OR PROCUREMENT

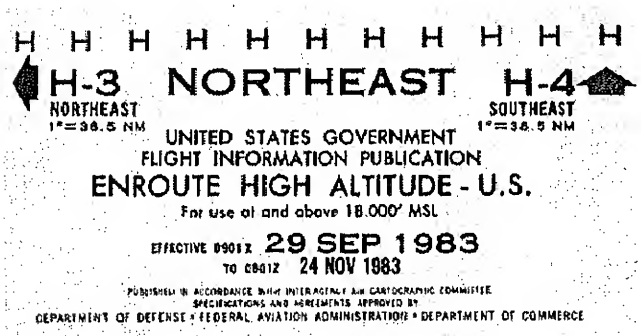
ENROUTE HIGH ALTITUDE CHARTS
Office of Charting and Geodetic Services

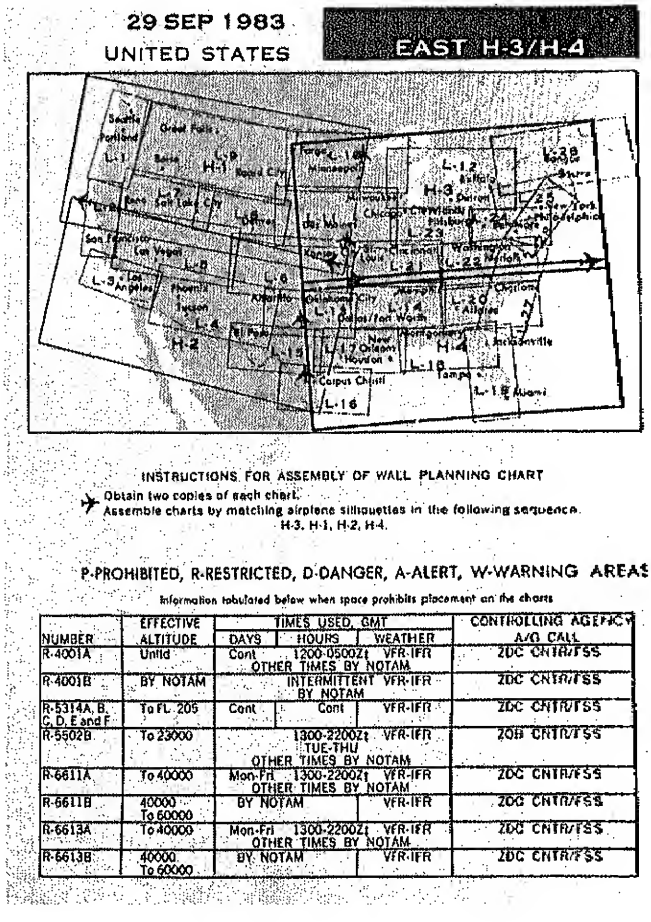
Issuance: Every 56 days.

Users: Military, commercial and general aviation pilots.

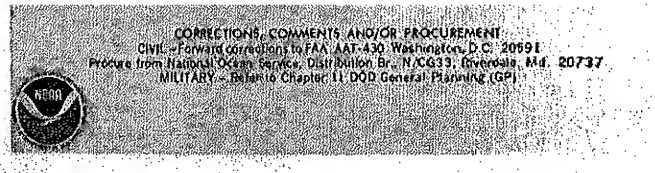
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Enroute High Altitude Charts provide aeronautical information for enroute instrument navigation (Instrument Flight Rules) in the high altitude stratum. This information includes the portrayal of jet routes; position, identification, and frequencies of radio aids; selected aerodromes; distances; time zones; special use airspace areas; and related information. These charts are at scales of 1″ equals 38.5 nautical miles and 1″ equals 45 nautical miles.





NUMBER	EFFECTIVE ALTITUDE	TIMES USED, GMT DAYS	HOURS	WEATHER	CONTROLLING AGENCY A/G CALL
R-4001A	Unltd	Cont	1200-0500Z‡	VFR-IFR	ZDC CNTR/FSS
		OTHER TIMES BY NOTAM			
R-4001B	BY NOTAM	INTERMITTENT BY NOTAM		VFR-IFR	ZDC CNTR/FSS
R-5314A, B, C, D, E and F	To FL 205	Cont	Cont	VFR-IFR	ZDC CNTR/FSS
R-5502B	To 23000	1300-2200Z‡ TUE-THU		VFR-IFR	ZDC CNTR/FSS
		OTHER TIMES BY NOTAM			
R-6611A	To 40000	Mon-Fri	1300-2200Z‡	VFR-IFR	ZDC CNTR/FSS
		OTHER TIMES BY NOTAM			
R-6611B	40000 To 60000	BY NOTAM		VFR-IFR	ZDC CNTR/FSS
R-6613A	To 40000	Mon-Fri	1300-2200Z‡	VFR-IFR	ZDC CNTR/FSS
		OTHER TIMES BY NOTAM			
R-6613B	40000 To 60000	BY NOTAM		VFR-IFR	ZDC CNTR/FSS



STANDARD INSTRUMENT DEPARTURE (SID) CHARTS

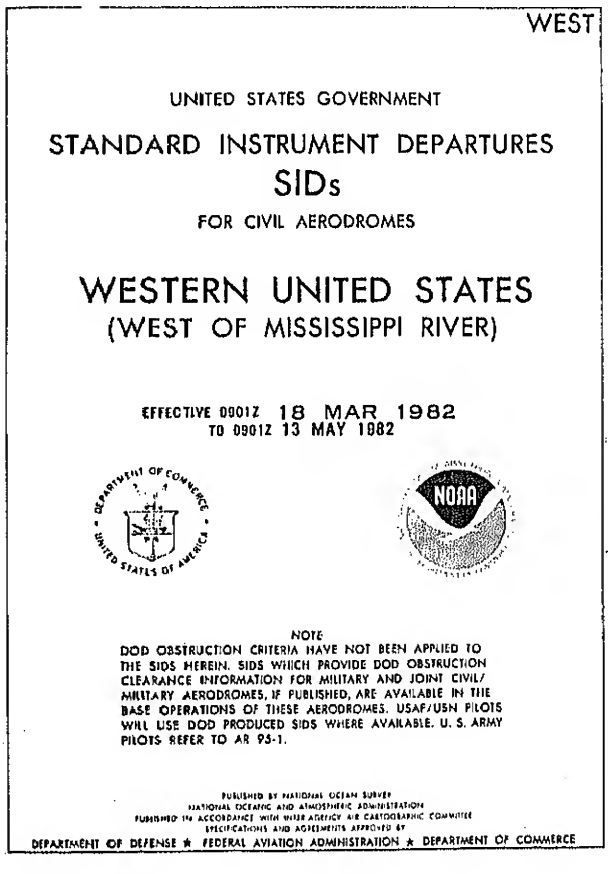
Office of Charting and Geodetic Services

Issuance: Every 56 days.

Users: Military, commercial, and general aviation pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *SID Charts* provide pilots with departure routing clearance in graphic and textual form. These charts are designed to expedite clearance delivery and to facilitate transition between takeoff and enroute operations. They are published at varying scales in bound 5-3/8″ x 8-1/4″ books which are arranged alphabetically by airport name. There are two volumes: Eastern United States and Western United States.



WEST

UNITED STATES GOVERNMENT

STANDARD INSTRUMENT DEPARTURES

SIDs

FOR CIVIL AERODROMES

WESTERN UNITED STATES

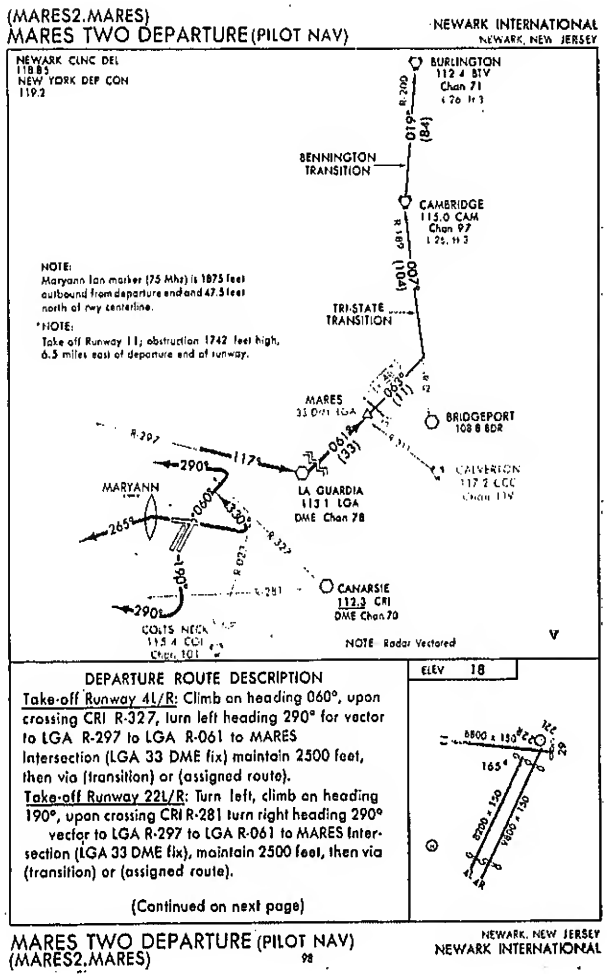
(WEST OF MISSISSIPPI RIVER)

EFFECTIVE 0901Z 18 MAR 1982
TO 0901Z 13 MAY 1982

NOTE

DOD OBSTRUCTION CRITERIA HAVE NOT BEEN APPLIED TO THE SIDS HEREIN. SIDS WHICH PROVIDE DOD OBSTRUCTION CLEARANCE INFORMATION FOR MILITARY AND JOINT CIVIL/MILITARY AERODROMES, IF PUBLISHED, ARE AVAILABLE IN THE BASE OPERATIONS OF THESE AERODROMES. USAF/USN PILOTS WILL USE DOD PRODUCED SIDS WHERE AVAILABLE. U. S. ARMY PILOTS REFER TO AR 95-1.

PUBLISHED BY NATIONAL OCEAN SURVEY
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
PUBLISHED IN ACCORDANCE WITH INTER AGENCY AIR CARTOGRAPHIC COMMITTEE SPECIFICATIONS AND AGREEMENTS APPROVED BY
DEPARTMENT OF DEFENSE ★ FEDERAL AVIATION ADMINISTRATION ★ DEPARTMENT OF COMMERCE



STANDARD TERMINAL ARRIVAL (STAR) CHARTS

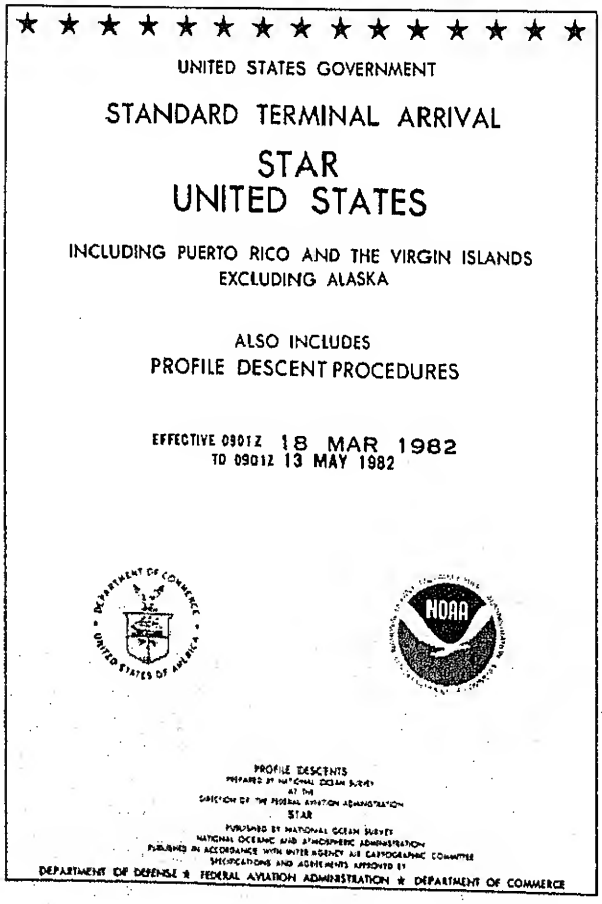
Office of Charting and Geodetic Services

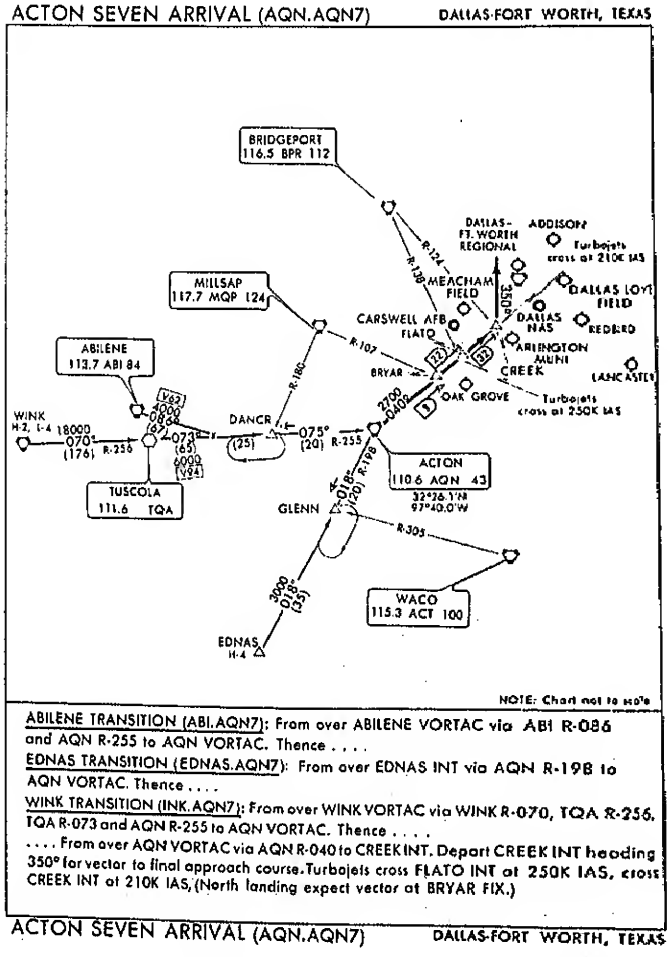
Issuance: Every 56 days.

Users: Military, commercial, and general aviation pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *STAR Charts*, published in one volume, provide pilots with Instrument Flight Rules (IFR) air traffic control arrival procedures in graphic and textual form. These charts are designed to expedite air traffic control arrival procedures and to facilitate transition between enroute and instrument approach operations. They are published at varying scales, arranged alphabetically by STAR name, and bound in a 5-3/8" x 8-1/4" book. Each STAR procedure is presented as a separate chart which may serve a single airport or more than one airport in a given geographical location. Furthermore, the STAR publication contains the *Profile Descent Procedure Charts*. These charts are basically a graphic portrayal of an uninterrupted descent from cruising altitude to a point shown within the Instrument Approach Procedure Chart. These profile charts are part of a continuing effort to enhance safety and conserve energy and are designed to reduce low-altitude flying time of high performance aircraft.





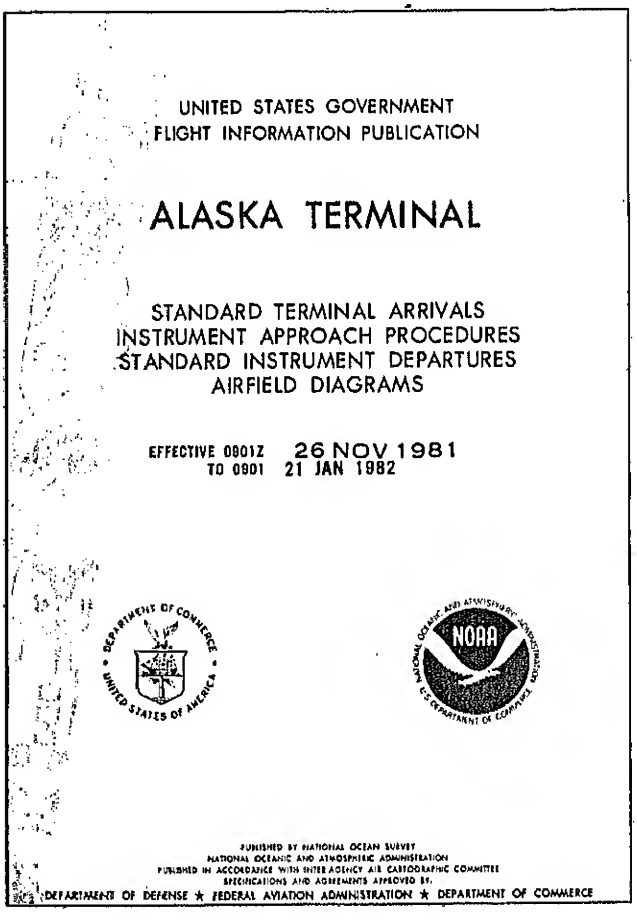
ALASKA TERMINAL FLIGHT INFORMATION PUBLICATION (FLIP)
Office of Charting and Geodetic Services

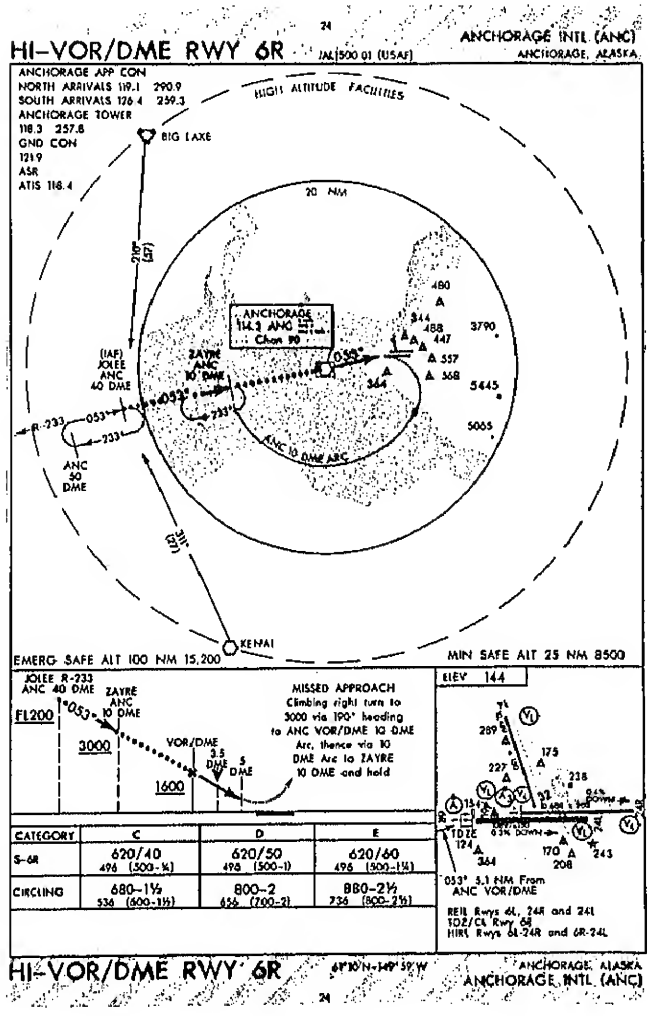
Issuance: Every 56 days.

Users: Military, private, and commercial pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Alaska Terminal Flight Information Publication* contains charts depicting all terminal flight procedures in the State of Alaska for civil and military aviation. This publication is published in a bound 5-⅜″ x 8-¼″ book, which is arranged alphabetically by airport name.





Cover and chart from Alaska Terminal FLIP.

SUPPLEMENT ALASKA
Office of Charting and Geodetic Services

Issuance: Every 56 days.
Users: Military, commercial, and private pilots.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Supplement Alaska* is a joint Civil/Military Flight Information Publication (FLIP), prepared by NOS in a 5-3/8″ x 8-1/4″ bound book and designed for use with the Flight Information Publication Enroute Charts, Alaska Terminal Charts, World Aeronautical Charts, and Sectional Aeronautical Charts. The supplement contains an aerodrome/facility directory of all aerodromes shown on the enroute charts, aerodrome sketches, communications data, navigational facilities, and special notices and procedures applicable to the area of chart coverage.

UNITED STATES GOVERNMENT FLIGHT INFORMATION PUBLICATION

SUPPLEMENT

ALASKA **AK**

EFFECTIVE 0901Z 24 NOV 1983
TO 0901Z 19 JAN 1984

Consult NOTAMS for latest information.

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TIME ZONE CHANGE SEE NOTICES

Published at Washington, D.C.
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
PUBLISHED IN ACCORDANCE WITH INTER-AGENCY AIR CARTOGRAPHIC COMMITTEE SPECIFICATIONS AND AGREEMENTS APPROVED BY:
DEPARTMENT OF DEFENSE ★ FEDERAL AVIATION ADMINISTRATION ★ DEPARTMENT OF COMMERCE

VFR MILITARY TRAINING ROUTES (VR)

The graphic below identifies VFR Military Training Routes in Alaska. Operations on these routes are conducted in accordance with visual flight rules. Current information concerning the route utilization is available from the appropriate Flight Service Station (FSS) within 100 miles of the route.

In addition to the graphic below, if there is a change to an MTR depicted on the Sectionals or Terminal Area Charts covering Alaska, it will be listed below. Contact the FSS or refer to Area Planning AP/1B for details of the changes.

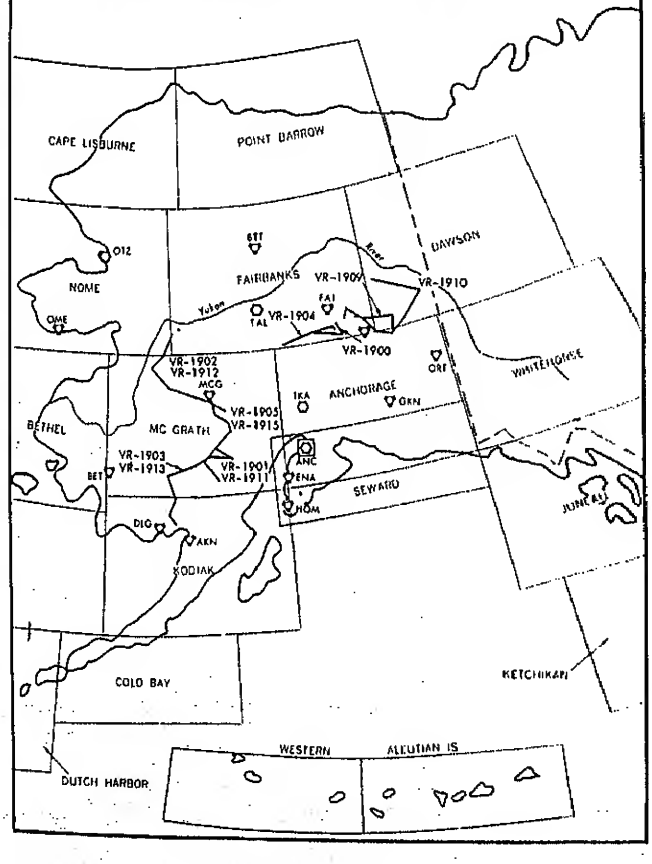
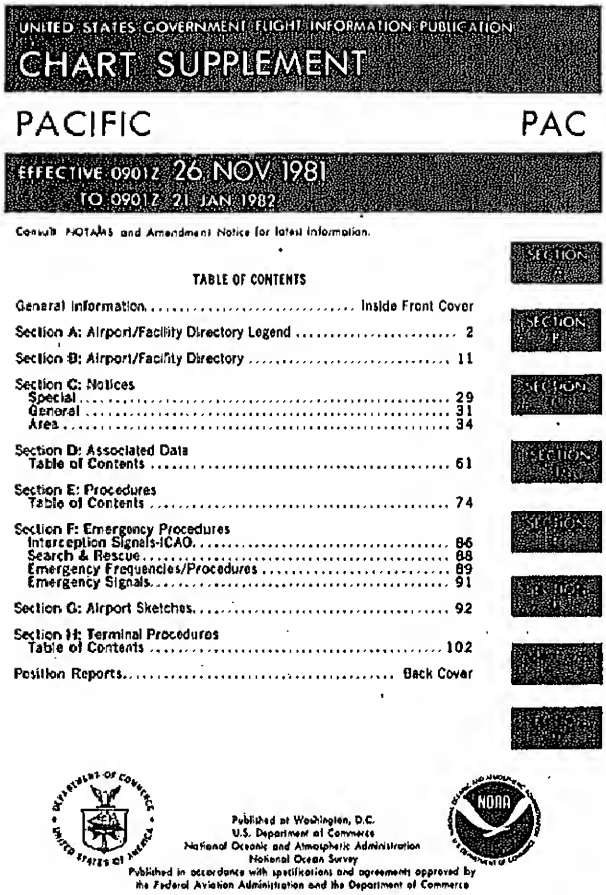


CHART SUPPLEMENT PACIFIC
Office of Charting and Geodetic Services

Issuance: Every 56 days.
Users: Military, private, and commercial pilots.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Chart Supplement Pacific*, a Civil Flight Information Publication (FLIP), is published and distributed by NOS in a 5-⅜″ x 8-¼″ bound book and designed for use with the Flight Information Publication (FLIP) Enroute Charts and with the Sectional Aeronautical Charts that cover the State of Hawaii and that area of the Pacific served by U.S. facilities. This chart supplement contains an aerodrome/facility directory of all aerodromes open to the public, airport sketches, communications data, navigational facilities, and special notices and procedures applicable to the Pacific area. Instrument Approach Procedure Charts for Hawaii and the Pacific Islands are included.



UNITED STATES GOVERNMENT FLIGHT INFORMATION PUBLICATION

CHART SUPPLEMENT

PACIFIC PAC

EFFECTIVE 0901Z 26 NOV 1981
TO 0901Z 21 JAN 1982

Consult NOTAMS and Amendment Notice for latest information.

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Published at Washington, D.C.
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Survey
Published in accordance with specifications and agreements approved by the Federal Aviation Administration and the Department of Commerce

INSTRUMENT APPROACH PROCEDURE CHARTS (IAPC)

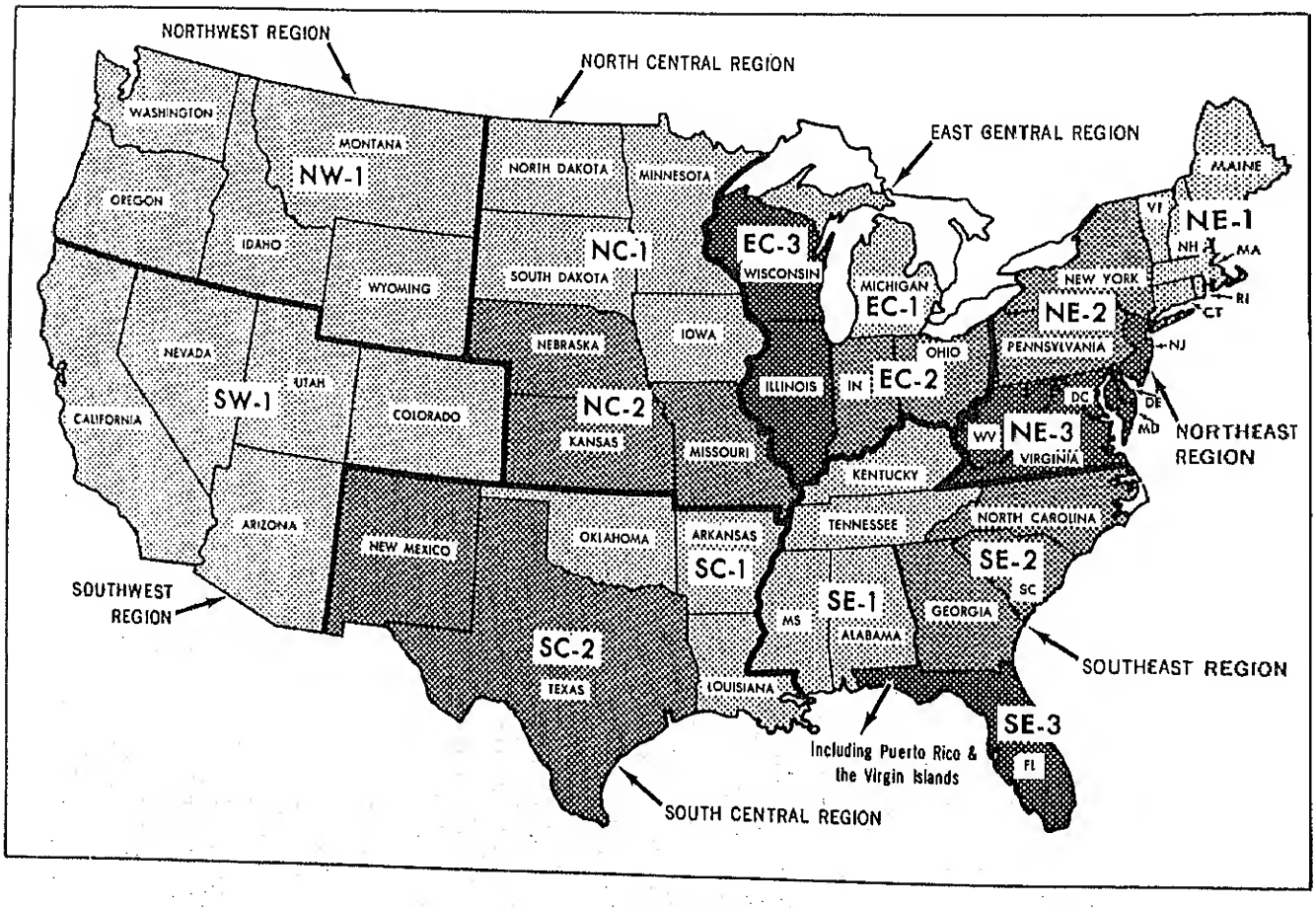
Office of Charting and Geodetic Services

Issuance: Volumes are published every 56 days and updated with a Change Notice on the 28th day of a publication cycle.

Users: Military, private, and commercial pilots.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

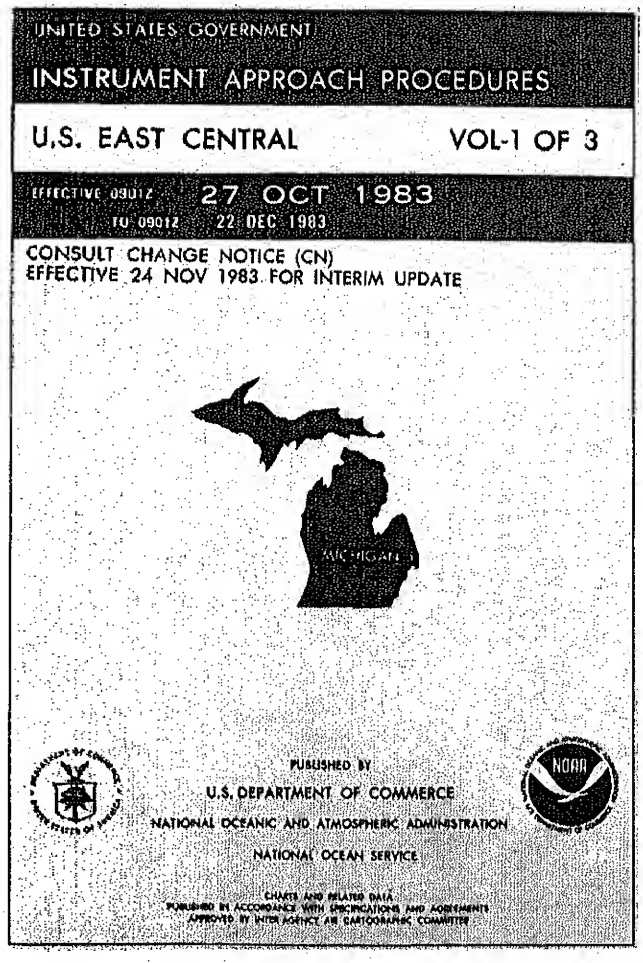
The *Instrument Approach Procedure Charts* portray the aeronautical data required for pilots to execute instrument approaches to airports. Each chart, bound in a 5-⅜″ x 8-½″ volume, depicts the instrument approach, all related data, and the airport diagram. The 15-bound volumes provide complete coverage of the conterminous United States, including Puerto Rico and the U.S. Virgin Islands.

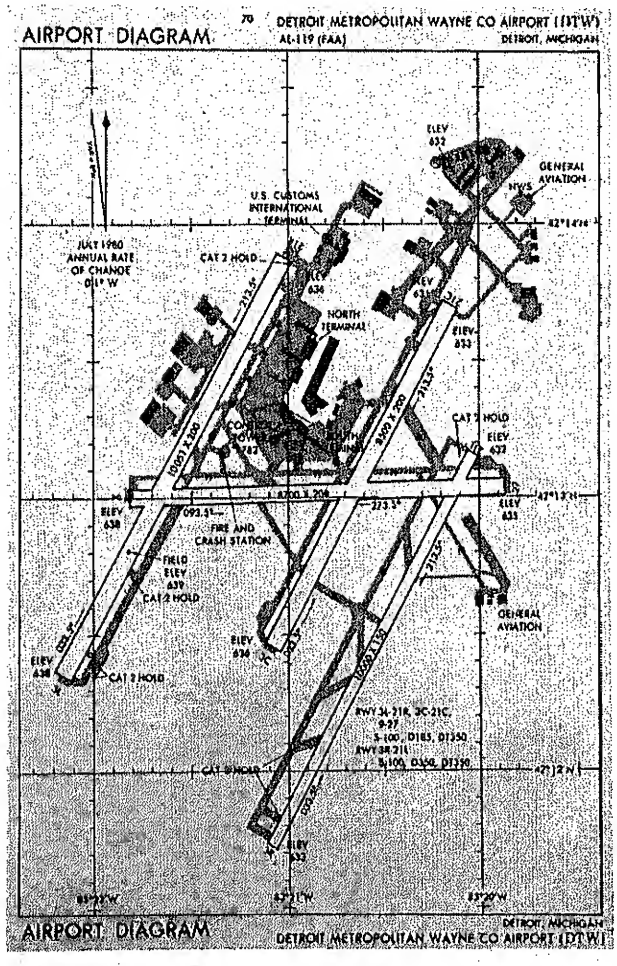


AIRPORT DIAGRAMS
Office of Charting and Geodetic Services

Issuance: Every 56 days.
Users: Private and commercial pilots.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Airport Diagrams, produced for major airports with a large number of taxiways, are published to accompany the bound volumes of the Instrument Approach Procedure Charts. The bound 5-⅜″ x 8-¼″ *Airport Diagrams* show the airport layout, with emphasis on the taxiways, noncommercial buildings, and parking apron areas.

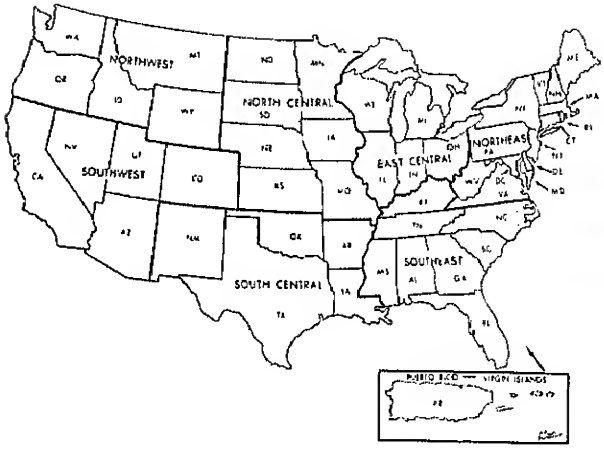


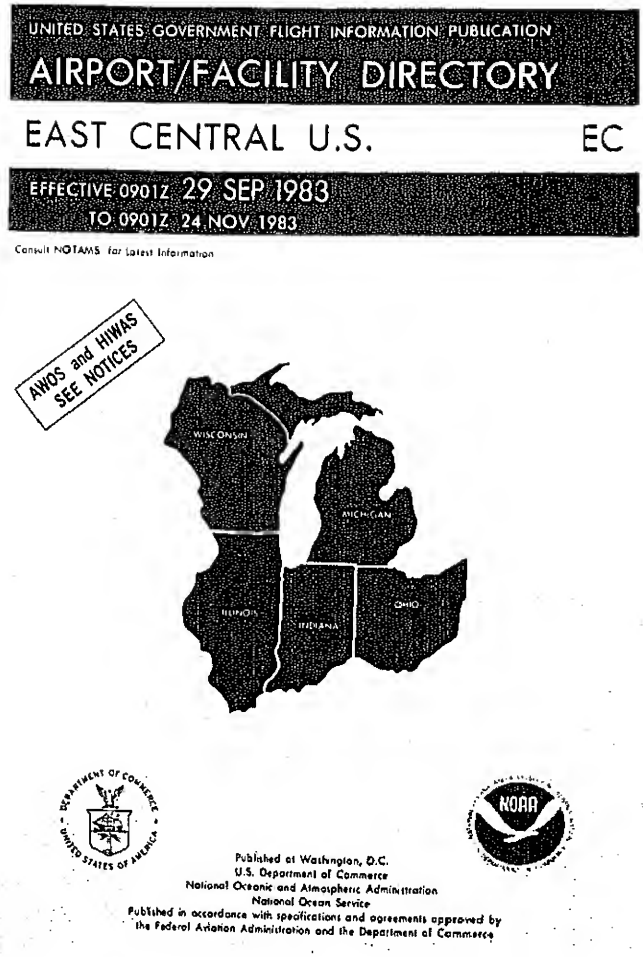


AIRPORT/FACILITY DIRECTORY
Office of Charting and Geodetic Services

Issuance: Every 56 days.
Users: Military, private, and commercial pilots.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Airport/Facility Directory*, designed primarily as a pilot's operational manual, depicts airports, seaplane bases, heliports open to the public, and navigational facilities and contains communication data and certain special notices and procedures. The directory, published in seven volumes, covers the conterminous United States, Puerto Rico, and the U.S. Virgin Islands. Each volume is indexed by a State and an airport name.

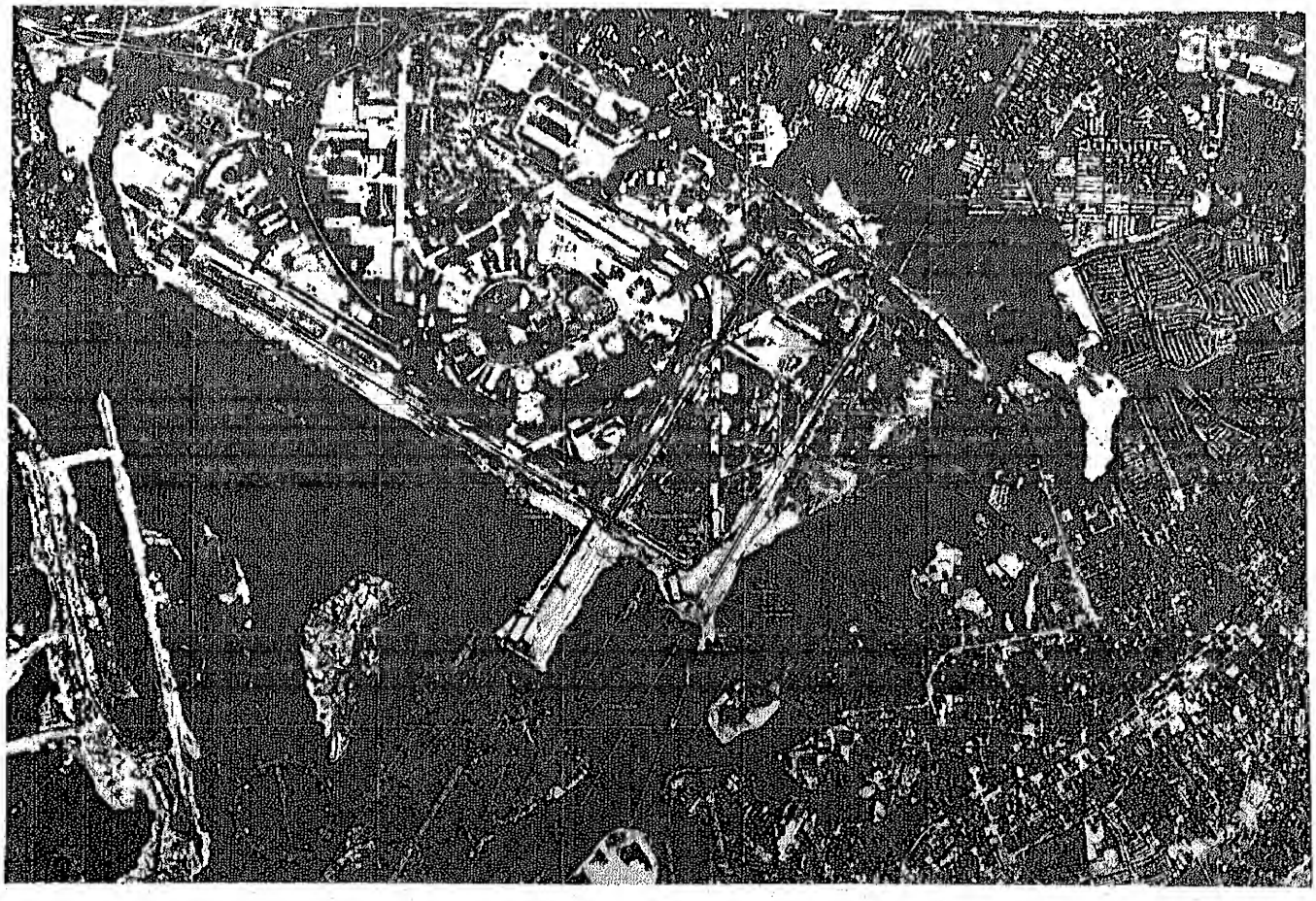




AIRPORT OBSTRUCTION CHARTS
Office of Charting and Geodetic Services

Issuance: Every 2 to 3 years (or as required)
Users: Federal Aviation Administration and commercial airlines.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Airport Obstruction Charts present a large scale (1:12,000) plan view of each individual airport. These charts are produced as part of a reimbursable airport survey program between the NOS Photogrammetry Branch and the Federal Aviation Administration. These charts show important geographical features, approaches, aids to navigation, and the location and height of all obstructions located in the general area of the airfield. A plan view and profile view of each approach are portrayed on the reverse side of each chart and show any obstruction located in the approach path. The FAA requires all commercial airlines to possess a copy of an *Airport Obstruction Chart* for each airport they serve. These charts are used as an engineering planning aid by the airlines for determining weight restrictions for landing and takeoff of any plane serving the airport. Some *Obstruction Charts* have an aerial photographic background, such as the example shown below, and are presented in a slightly different format than the conventional charts.



Airport Obstruction Chart for John F. Kennedy International Airport, New York, N.Y., OC 610, September 1978.

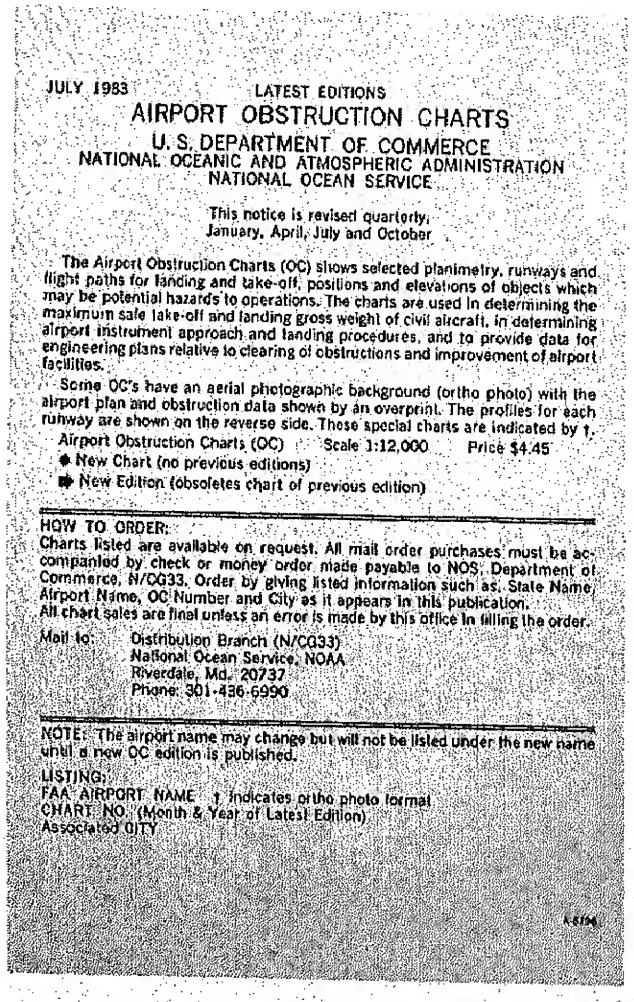
DATES OF LATEST EDITIONS
Office of Charting and Geodetic Services

Issuance: Monthly; Obstruction Charts, quarterly.

Users: Private and commercial pilots and the general public.

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Three *Dates of Latest Editions* are prepared for aeronautical charts by NOS. One edition is prepared for all visual charts NOS produces; one for Airport Obstruction Charts NOS publishes; and one for U.S. Department of Defense aeronautical charts NOS distributes. These publication listings include all charts, dates, and highlights of new or revised charts.



JULY 1983 LATEST EDITIONS

AIRPORT OBSTRUCTION CHARTS

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

This notice is revised quarterly,
January, April, July and October

The Airport Obstruction Charts (OC) shows selected planimetry, runways and flight paths for landing and take-off, positions and elevations of objects which may be potential hazards to operations. The charts are used in determining the maximum safe take-off and landing gross weight of civil aircraft, in determining airport instrument approach and landing procedures, and to provide data for engineering plans relative to clearing of obstructions and improvement of airport facilities.

Some OC's have an aerial photographic background (ortho photo) with the airport plan and obstruction data shown by an overprint. The profiles for each runway are shown on the reverse side. These special charts are indicated by †.

Airport Obstruction Charts (OC) Scale 1:12,000 Price $4.45

✱ New Chart (no previous editions)

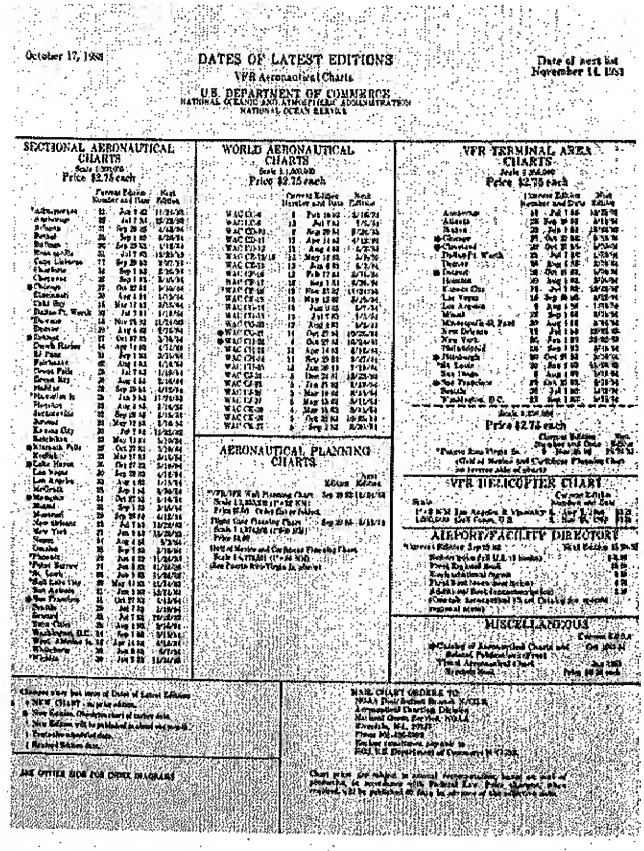
➡ New Edition (obsoletes chart of previous edition)

HOW TO ORDER:
Charts listed are available on request. All mail order purchases must be accompanied by check or money order made payable to NOS, Department of Commerce, N/CG33. Order by giving listed information such as: State Name, Airport Name, OC Number and City as it appears in this publication. All chart sales are final unless an error is made by this office in filling the order.

Mail to: Distribution Branch (N/CG33)
National Ocean Service, NOAA
Riverdale, Md. 20737
Phone: 301-436-6990

NOTE: The airport name may change but will not be listed under the new name until a new OC edition is published.

LISTING:
FAA AIRPORT NAME † Indicates ortho photo format
CHART NO. (Month & Year of Latest Edition)
Associated CITY



October 17, 1983 DATES OF LATEST EDITIONS Date of next ed. November 11, 1983

VFR Aeronautical Charts

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

SECTIONAL AERONAUTICAL CHARTS
Scale 1:500,000
Price $2.75 each

WORLD AERONAUTICAL CHARTS
Scale 1:1,000,000
Price $2.75 each

VFR TERMINAL AREA CHARTS
Scale 1:250,000
Price $2.75 each

AERONAUTICAL PLANNING CHARTS

VFR HELICOPTER CHART

AIRPORT/FACILITY DIRECTORY

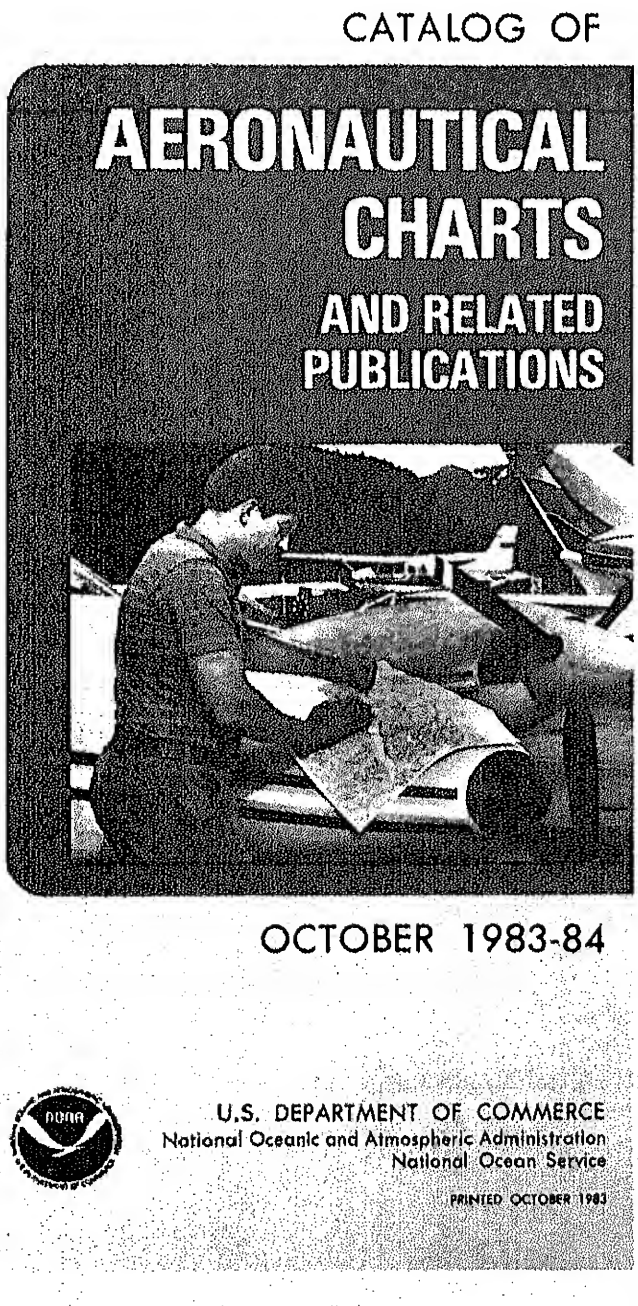
MISCELLANEOUS

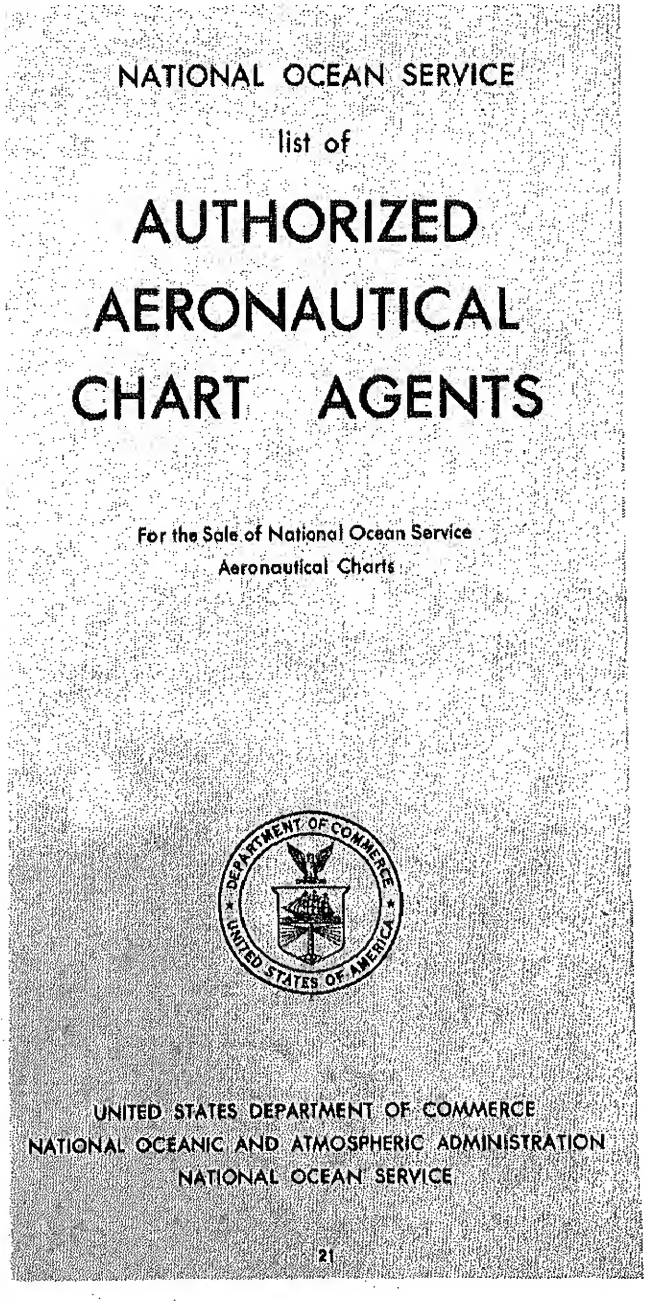
BASE CHART ORDERS TO:

CATALOG OF AERONAUTICAL CHARTS AND RELATED PUBLICATIONS
Office of Charting and Geodetic Services

Issuance: Annually.
Users: Pilots and general public.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Catalog of Aeronautical Charts and Related Publications*, produced and maintained by NOS, contains a brief description of each aeronautical publication NOS produces, the publication's price, other pertinent information needed in selecting and ordering an aeronautical product, and a list of authorized sales agents. The catalog also contains a selected list of FAA publications and lists the charts available at NOS facilities, but published by the U.S. Defense Mapping Agency Aerospace Center (DMAAC). The catalog is supplemented by brochures used in subscription orders of the Visual Aeronautical and Instrument Navigation Charts covering the United States and U.S. territories.





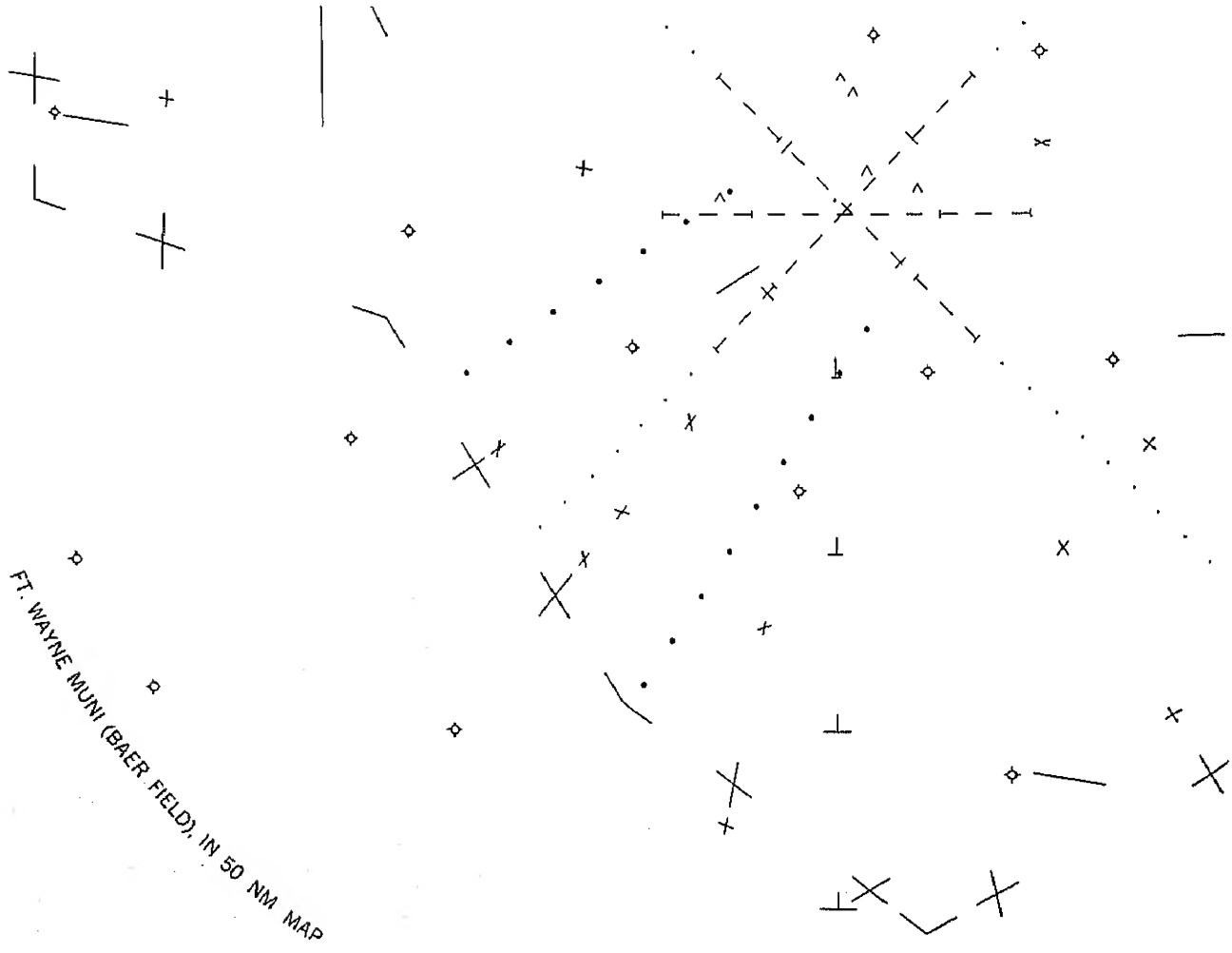
RADAR VIDEO MAPS
Office of Charting and Geodetic Services

Issuance: As required.

Users: Federal Aviation Administration, airport control towers, and flight control facilities.

For information, write or call: Aeronautical Charting Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8071).

The *Radar Video Maps* are ⅛″-thick plates of varying sizes made specifically for and at the request of the Federal Aviation Administration. These plates are projected onto a radar scope so that the image of the moving aircraft, represented as blips on the scope, is superimposed over the mapped features shown on the plate. One type is for the traffic control routes between airports and a second type is for airports' air traffic control towers. Both types of plates depict the important airways, reporting points, and control points.

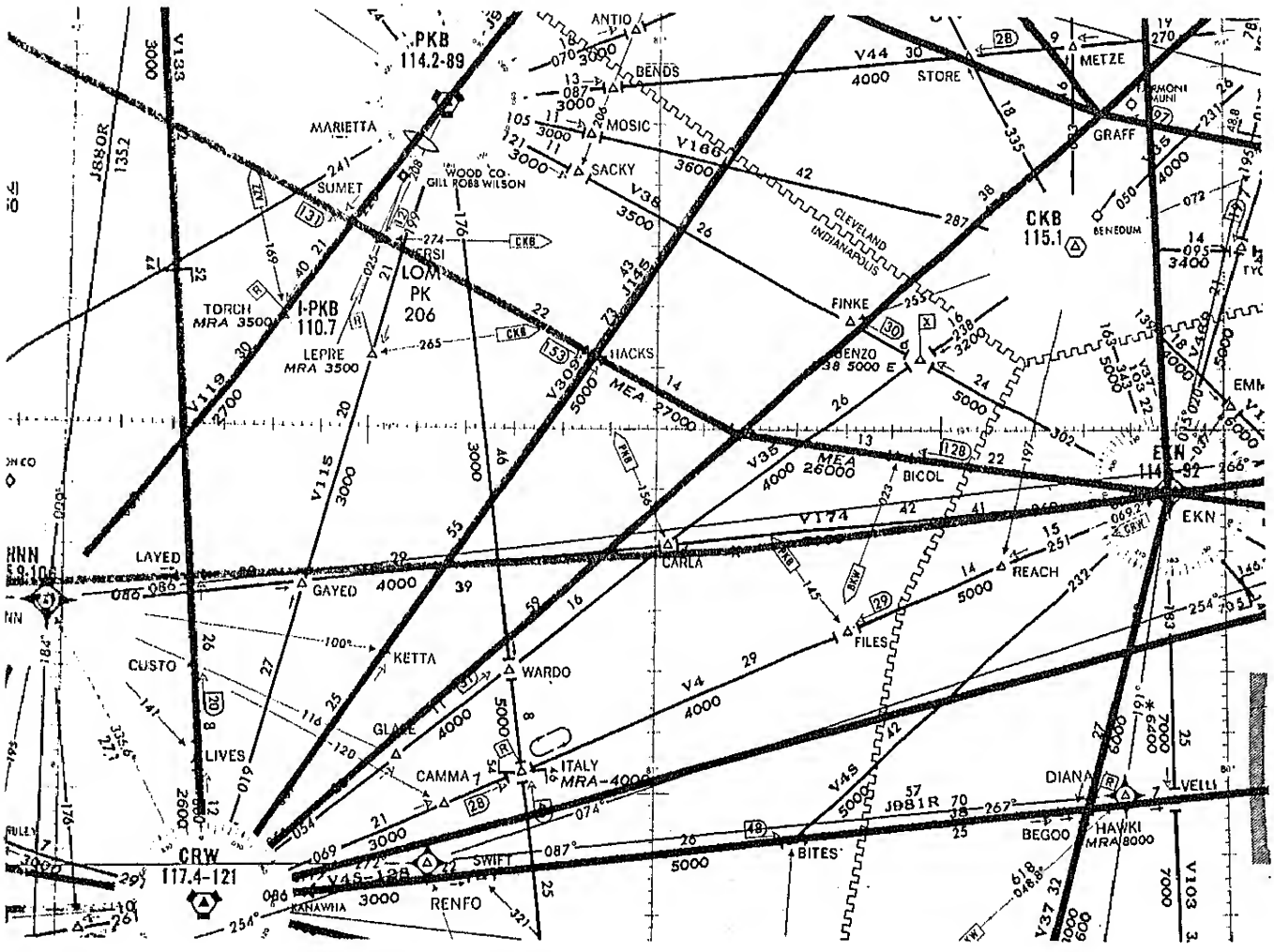


A photo-positive portion of the Ft. Wayne Municipal Airport Radar Video Map.

CONTROLLER CHARTS
Office of Charting and Geodetic Services

Issuance: Every 56 days.
Users: Federal Aviation Administration
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

Controller Charts are published at the request of the Federal Aviation Administration and used by FAA controllers. These charts show all necessary information to control aircraft in the major air corridors of the United States. These charts are used by civil airport controllers and others involved in airspace control.



Controller Chart 19

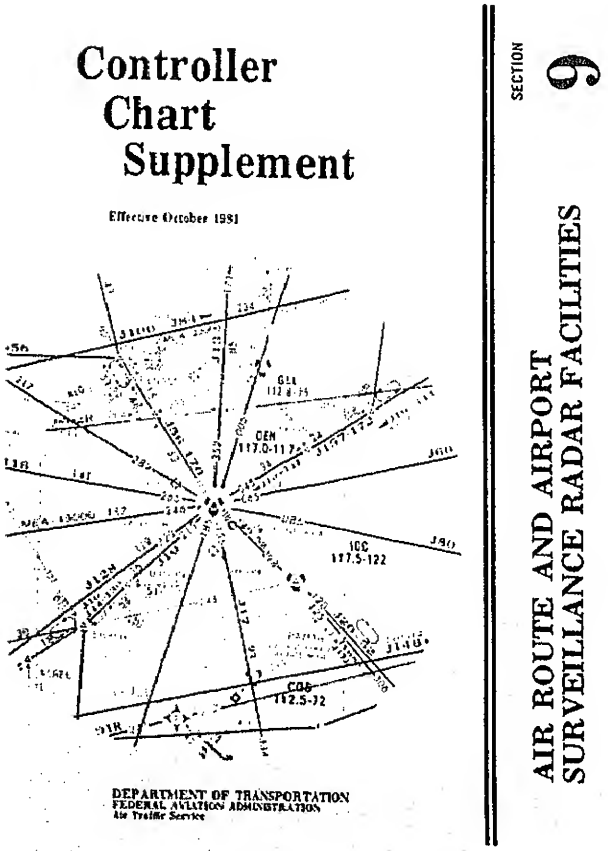
CONTROLLER CHART SUPPLEMENT
Office of Charting and Geodetic Services

Issuance: Every 160 days.

Users: Federal Aviation Administration

For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

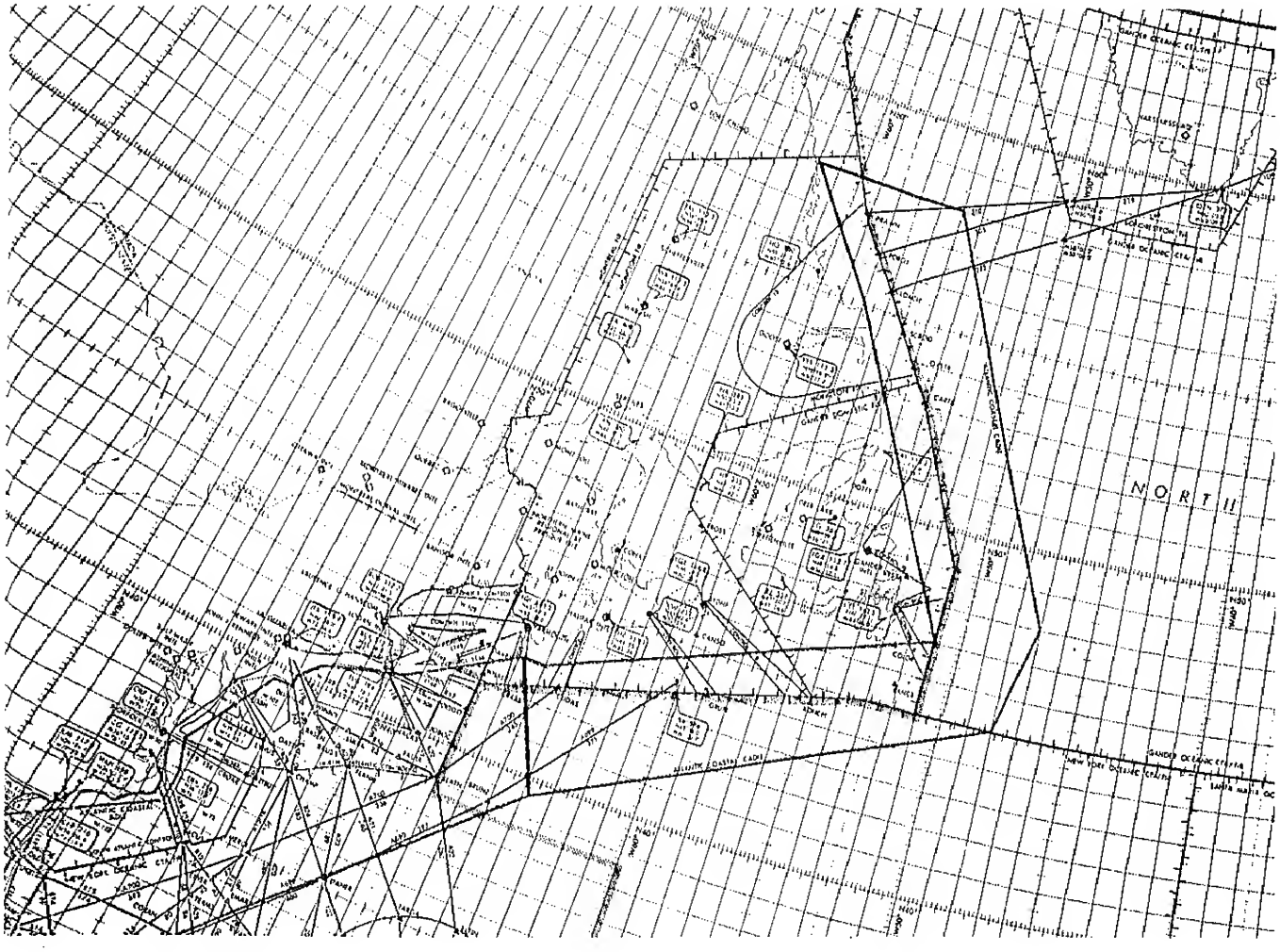
The *Controller Chart Supplement*, maintained and published at the request of the Federal Aviation Administration, provides information that is not readily available to air traffic control facility personnel in a usable and convenient format. The supplement contains geodetic definitions of airways and includes such information as the points for navigation facilities, air route traffic control center boundaries, reporting points, airway crossings, and airway intersections. The supplement has eight sections: Section 1, High Altitude Airways Conterminous United States; Section 2, Low Altitude Airways Conterminous United States; Section 4, Military Training Routes; Section 5, Alaska, Hawaii, and Puerto Rico Airways, and Bahama and Selected Oceanic Routes; Section 6, STAR's (Standard Terminal Arrivals and Profile Descent Procedures); Section 7, SID's (Standard Instrument Departures); Section 8, Preferred IFR (Instrument Flight Rules) Routes; and Section 9, Air Route and Airport Surveillance Radar Facilities. The first seven sections of the supplement are maintained and printed every 160 days, utilizing automatic data processing procedures; the last section is maintained and printed on request. Section 3 has been discontinued.



NORTH ATLANTIC ROUTE CHART
Office of Charting and Geodetic Services

Issuance: Every 168 days.
Users: Federal Aviation Administration.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *North Atlantic Route Chart* is published at the request of the Federal Aviation Administration and is used by air traffic controllers. The chart shows selected air routes and airports necessary for coordinating air traffic control in the North Atlantic area. The chart is published in two sizes.



MINIMUM SAFE ALTITUDE WARNING (MSAW) SYSTEM

Office of Charting and Geodetic Services

Issuance: As required.

Users: Federal Aviation Administration.

For orders and information, write or call: Aeronautical Charting Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8071).

The Minimum Safe Altitude Warning (MSAW) System is a program carried out by NOS at the request of the Federal Aviation Administration to obtain horizontal and vertical positional information in support of FAA's automated program. NOS personnel accomplish this mission by taking a grid and placing it over the chart of the area to be studied. Then, they locate, both horizontally and vertically, within the grid the highest point of each object determined to be an obstacle.

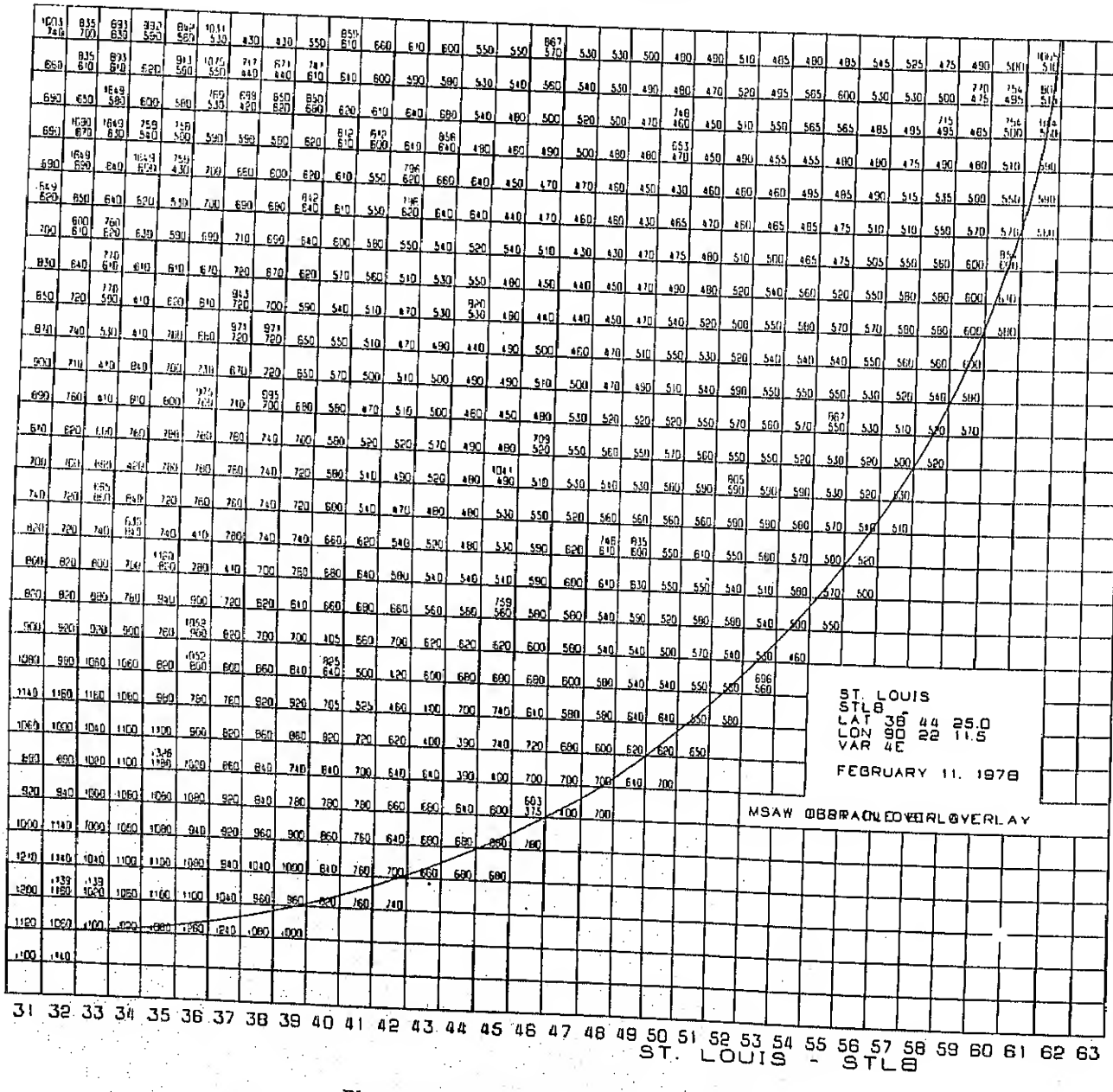


Photo positive portion of the St. Louis SAW Overlay

AIR TRAFFIC CONTROL SYSTEMS COMMAND CENTER (ATCSCC) CHARTS

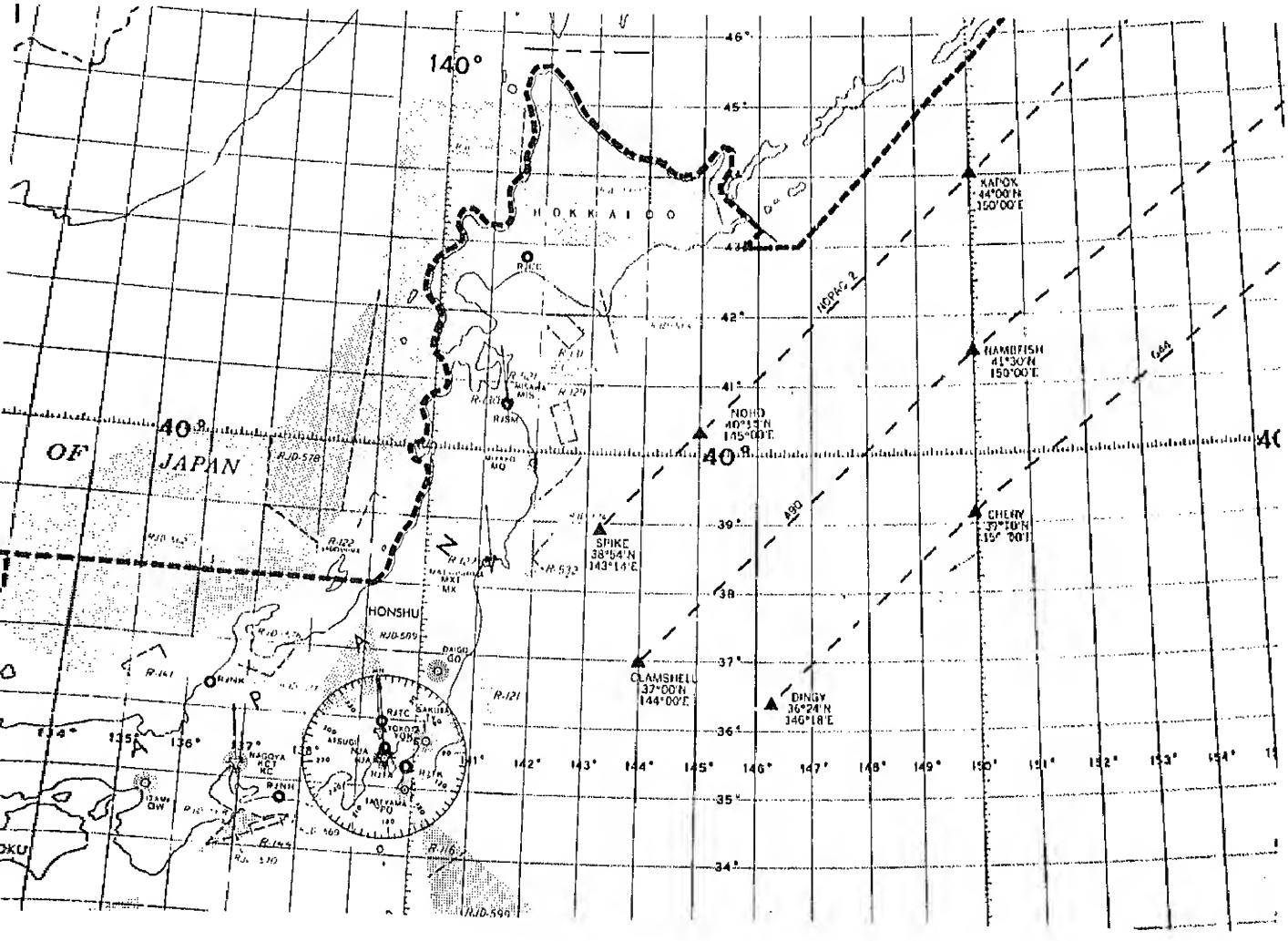
Office of Charting and Geodetic Services

Issuance: As required.

Users: Personnel of the Federal Aviation Administration.

For orders and information, write or call: Aeronautical Charting Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8071).

The *ATCSCC Charts*, maintained and published for the Federal Aviation Administration's use, designate the various airspaces reserved for VIP, civil, and military aircrafts. Details depicted on the five *ATCSCC* charts include high altitude routes, facilities, restricted airspace, and some reporting points. The areas covered by these charts are the entire United States, the Atlantic Ocean, the Pacific Ocean, and the Caribbean and Gulf of Mexico.



ATCSCC Pacific Ocean Area Chart, 21st edition.

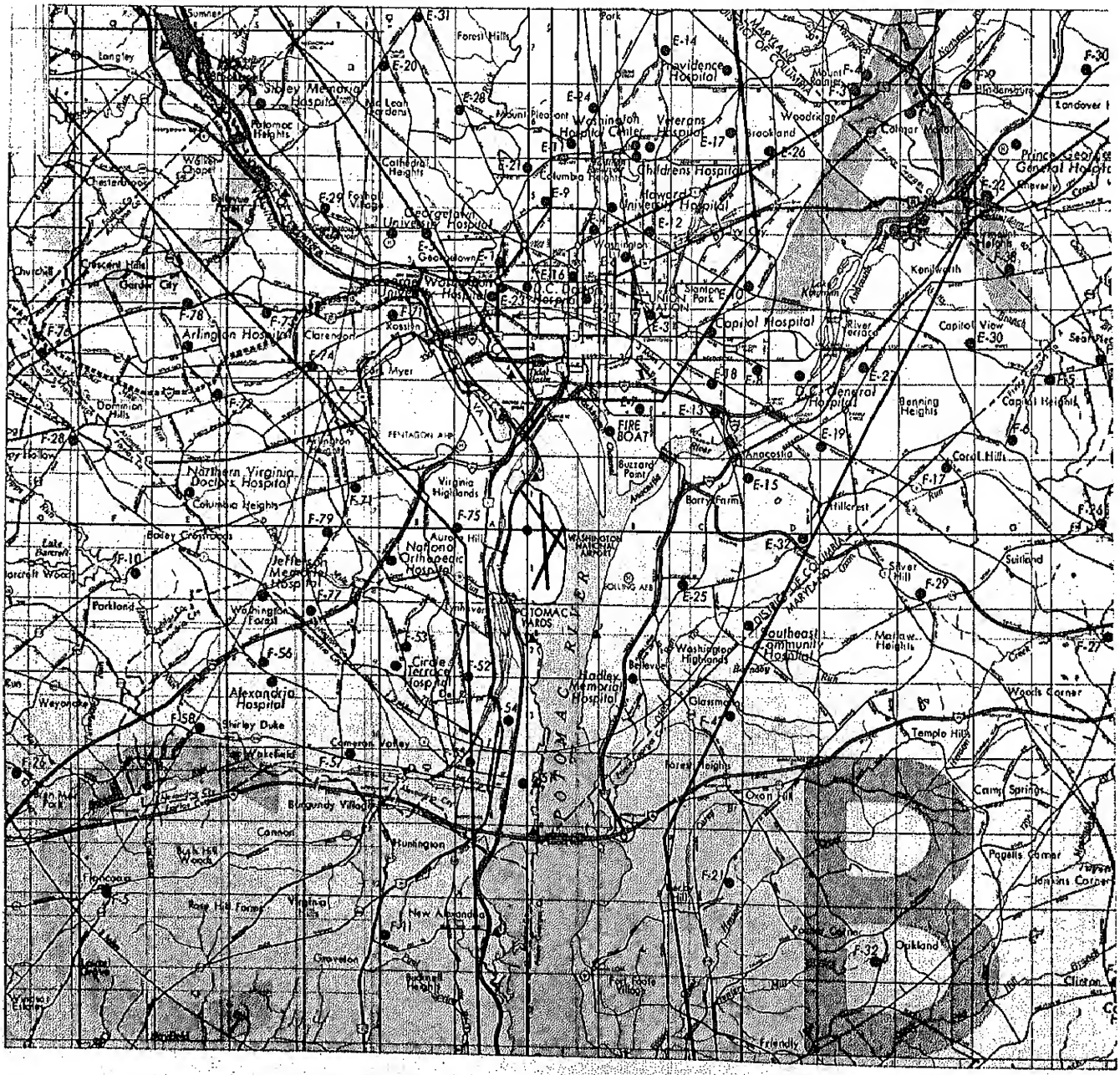
SEARCH AND RESCUE (SAR) CHARTS
Office of Charting and Geodetic Services

Issuance: Single issue of two charts.

Users: Local fire and rescue departments and the Federal Aviation Administration.

For information, write or call: Aeronautical Charting Division, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8071).

Search and Rescue (SAR) Charts are produced for both Washington National and Dulles International Airports to provide local fire and rescue departments with the locations and most expedient routes to hospitals. The maps are printed on a topographic base compiled from State and county maps and overprinted with grids divided into four quadrants (A, B, C, D) with number coordinates depicted around the neat (border) lines. There are two sizes of each.

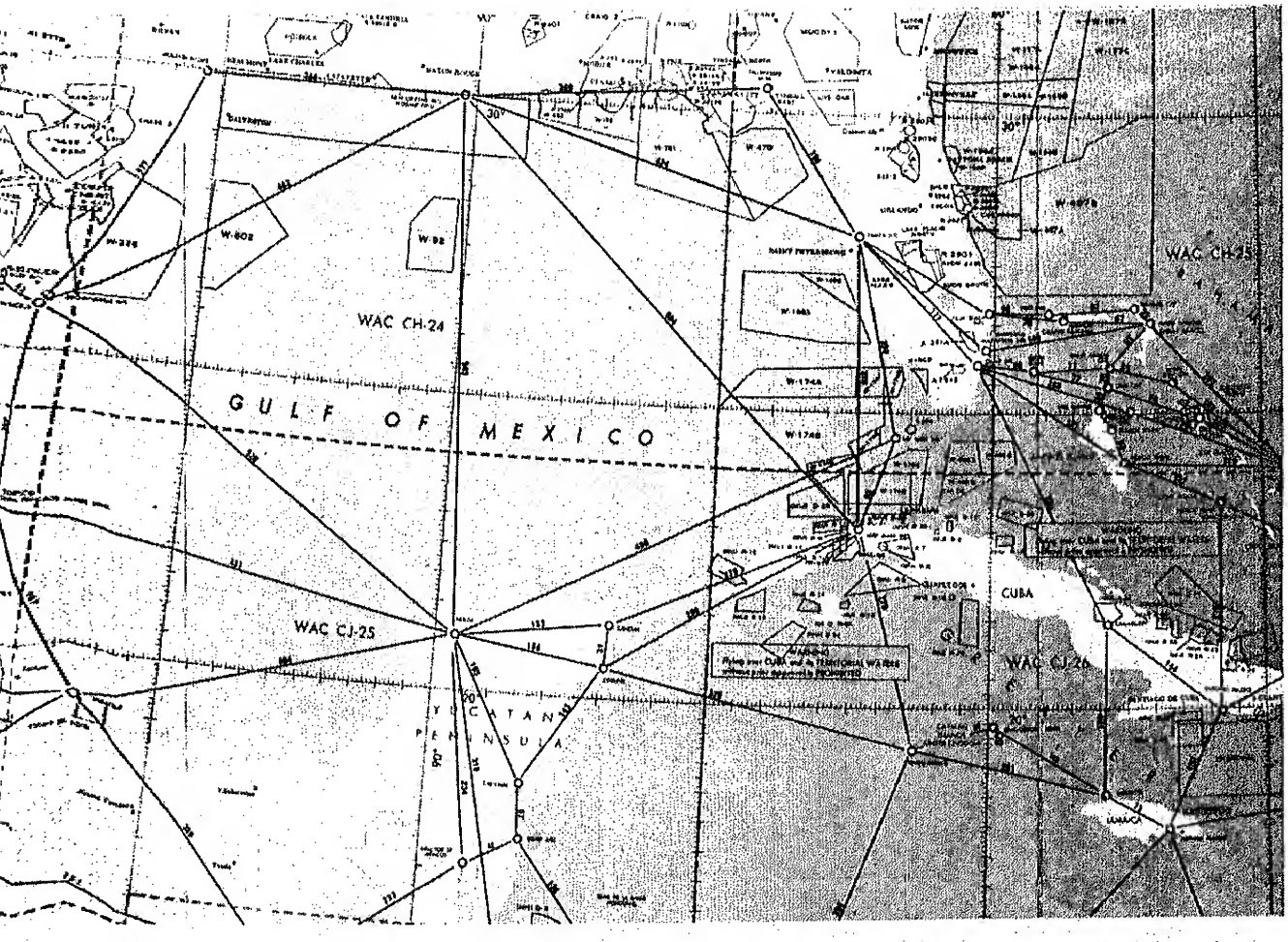


Washington National Airport SAR Chart, 1st edition.

GULF OF MEXICO AND CARIBBEAN PLANNING CHART
Office of Charting and Geodetic Services

Issuance: Annually.
Users: Airport planning staff and pilots.
For orders and information, write or call: Distribution Branch, National Ocean Service, NOAA, Riverdale, Md. 20737 (301-436-6990).

The *Gulf of Mexico and Caribbean Planning Chart* has the same information as the Visual Flight Rules (VFR) planning chart and provides on its reverse side the *Puerto Rico-Virgin Islands Terminal Area Chart.* Other aeronautical information includes visual and radio aids to navigation; airports; restricted areas; and related data.



Gulf of Mexico and Caribbean Planning Chart

COASTAL ZONE MANAGEMENT

Many of the coastal zone management activities of the National Ocean Service are administered through the Office of Ocean and Coastal Resource Management. Additional coastal information is provided by the Coastal Waves Program, a function of the NOS Office of the Chief Scientist. The Office of Ocean and Coastal Resource Management administers the Coastal Zone Management Act of 1972 and assists the coastal States in developing and carrying out comprehensive programs for managing their coastal zones, protecting coastal resources, such as wetlands and beaches, and increasing access for recreation. The Office is also engaged in Ocean Thermal Energy Conversion and deepsea bed mining. NOAA is responsible for the licensing of U.S. industries for the mining of the deepsea bed for manganese nodules.

Twenty-eight of the 35 coastal States have federally approved coastal zone management programs. In addition, six national marine sanctuaries have been designated to protect ocean areas that are of value to the Nation. All coastal States have participated in the NOS Coastal Program which provided incentives for States to develop and operate Coastal Zone Management programs. The Program now provides technical assistance to the States to become self-supporting. NOS assists coastal communities in developing regional plans for alleviating the threat of coastal hazards. These plans are designed to minimize the potentially catastrophic effects of hurricanes, severe storms, tornadoes, and flooding in the coastal regions of the United States. Marine Sanctuaries preserve and restore areas of U.S. coastal waters for their conservation, recreational, ecological, and aesthetic values. For example, the Monitor Sanctuary protects the wreck of the U.S.S. Monitor deep in the waters of Cape Hatteras, North Carolina. Estuarine sanctuaries provide field laboratories for studying the natural and other processes that affect estuarines so that stresses on these highly biologically productive areas can be minimized.

The Coastal Waves Program serves as the focal point for coastal waves research and for the collection and dissemination of wave data for scientific research and engineering. The primary goals of the Coastal Waves Program are to establish field measurements of coastal waves, develop and improve measuring systems and techniques, and develop, improve, and verify wave models.

BIENNIAL REPORT
Office of Ocean and Coastal Resource Management

Issuance: As required by Section 316 of the Coastal Zone Management Act of 1972, as amended.

Users: The statute requires that the Report be sent to the President, the President of the Senate, and the Speaker of the House of Representatives. Other recipients are: appropriate Congressional offices, federal agencies, state agencies, academia, environmentalists, industry representatives, and interested public citizens.

For information, write or call: Coastal Zone Information Center, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W. Washington, D.C. 20235 (202-634-4255)

The *Biennial Report* for Fiscal Years 1980 and 1981 is organized into two sections. Part I presents discussions of State and Federal coastal zone management activities organized by selected issue areas. Part I also presents overviews of the Estuarine Sanctuary, Marine Sanctuary, and Ocean Resources Coordination Assessment programs. Part II presents detailed information on individual State Coastal Zone Management Programs and Coastal Energy Impact Programs. In accordance with legislative requirements, research and education programs conducted by the CZM-related programs are listed, as well as program regulations promulgated or in force during the period covered by the Report.

COASTAL ZONE MANAGEMENT: AN ANNOTATED BIBLIOGRAPHY

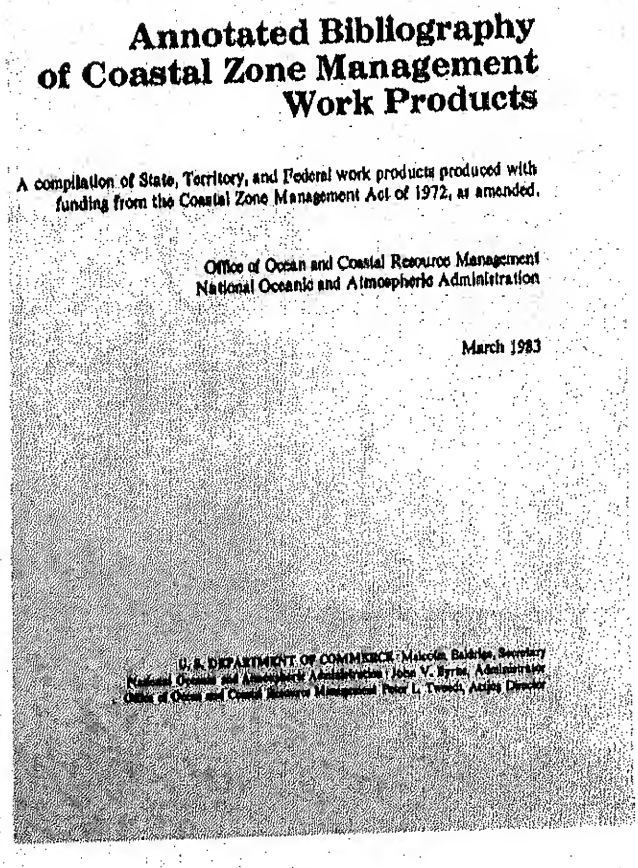
Office of Ocean and Coastal Resource Management

Issuance: March 1983

Users: State agencies, academia, and interested public citizens.

For information, write or call: Coastal Zone Information Center, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4255)

The *Annotated Bibliography* is a compilation of State, territory, and Federal work products produced in full or in part with funds from the Coastal Zone Management Act. The Bibliography was first produced in 1976 and updated in April 1980. Since that time, the output of State/territory CZM programs has increased tremendously. In addition, Coastal Energy Impact Program (CEIP) projects were not included in previous Bibliographies. The updated Bibliography will be a valuable comprehensive addition to coastal zone literature.



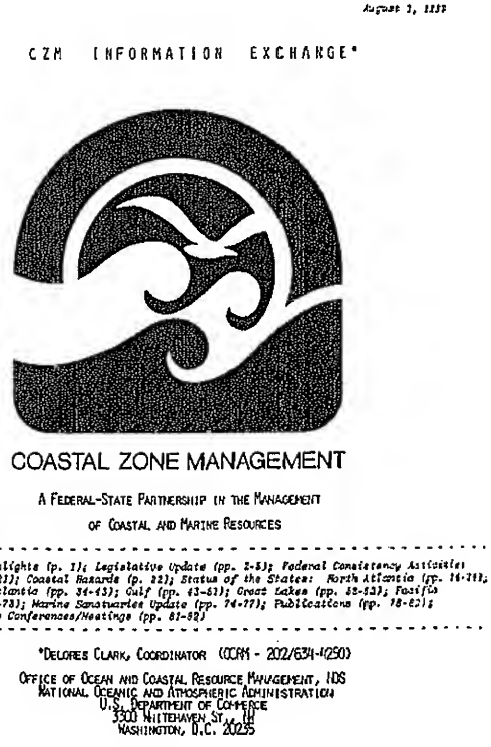
CZM INFORMATION EXCHANGE
Office of Ocean and Coastal Resource Management

Issuance: Every 2-3 months.

Users: Capitol Hill, State agencies, Federal agencies, industry representatives, environmentalists, academia, and interested public citizens.

For information, write or call: Coastal Zone Information Center, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4255)

The *Information Exchange* summarizes current activities in each State and provides the latest news at the Federal level. Additionally, there are discussion pieces on prominent coastal issues.



August 3, 1979

CZM INFORMATION EXCHANGE*

COASTAL ZONE MANAGEMENT

A FEDERAL-STATE PARTNERSHIP IN THE MANAGEMENT OF COASTAL AND MARINE RESOURCES

Contents: CZM Highlights (p. 1); Legislative Update (pp. 2-5); Federal Consistency Activities (pp. 6-21); Coastal Hazards (p. 21); Status of the States: North Atlantic (pp. 24-33); South Atlantic (pp. 34-43); Gulf (pp. 43-61); Great Lakes (pp. 48-53); Pacific (pp. 62-73); Marine Sanctuaries Update (pp. 74-77); Publications (pp. 78-82); Upcoming Conferences/Meetings (pp. 81-82)

*DELORES CLARK, COORDINATOR (OCRM - 202/634-1250)

OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT, NOS
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
3300 WHITEHAVEN ST., NW
WASHINGTON, D.C. 20235

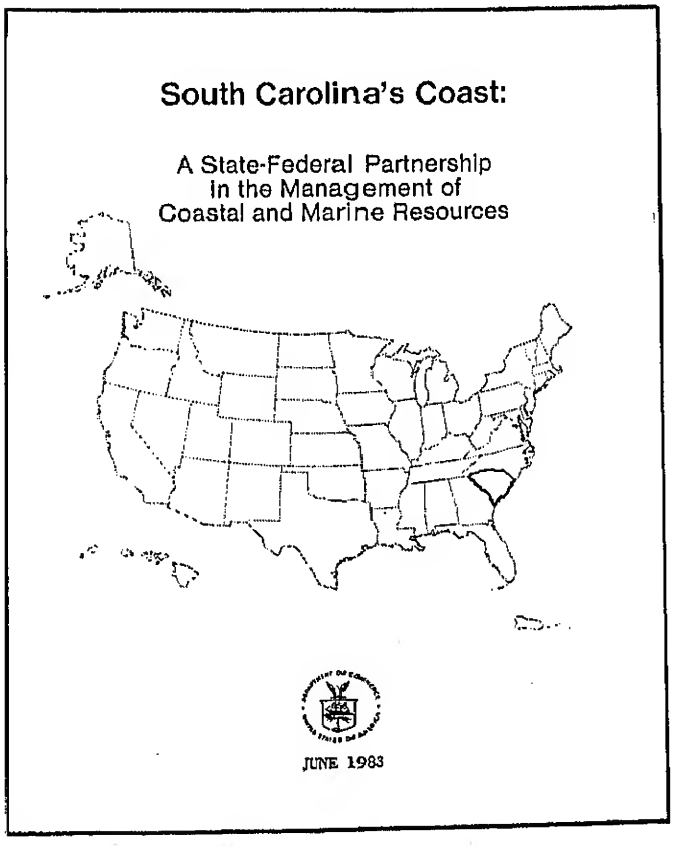
STATE BROCHURES
Office of Ocean and Coastal Resource Management

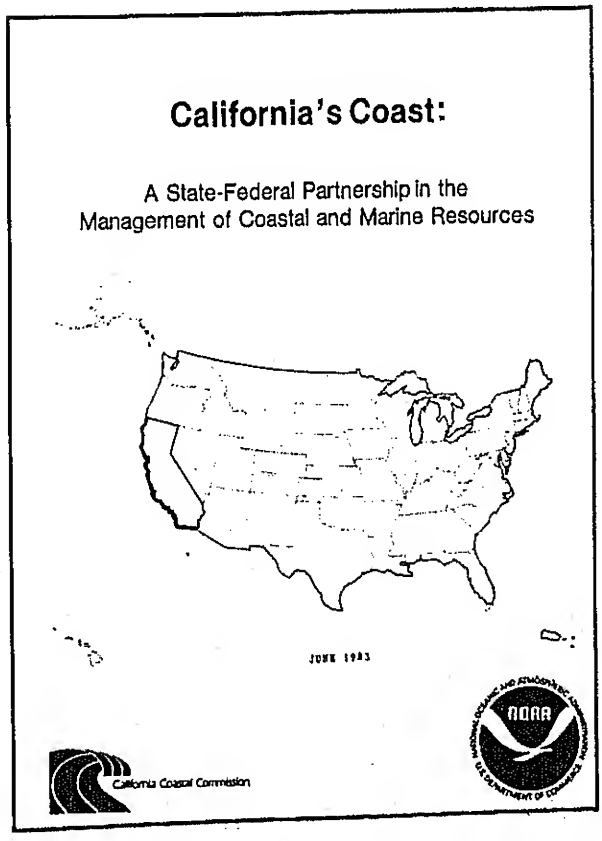
Issuance: Varies. Brochures are presently available for California, Florida, North Carolina, Rhode Island, and South Carolina. Other are planned for publication during 1983 and 1984.

Users: State agencies, Capitol Hill, and interested public citizens.

For information, write or call: Coastal Zone Information Center, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4255)

The *State Brochure* describes in detail (about 15 pages) a State's coastal zone management program and emphasizes projects funded under CZM. It also describes other NOAA activities in that State.





GENERAL INFORMATION BROCHURES
National Coastal Zone Management Progra
Office of Ocean and Coastal Resource Management

Issuance: Varies.

Users: Congressional offices, Federal and State agencies, academia, public interest groups, and private citizens, as requested.

For information, write or call: Coastal Zone Information Center, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4255)

Brochures are available on the National Coastal Zone Management Program, regulations, and specific related topics such as urban waterfront redevelopment, federal consistency, public participation, coastal recreation, energy facility siting, and classroom educational materials.

MANAGEMENT PLANS

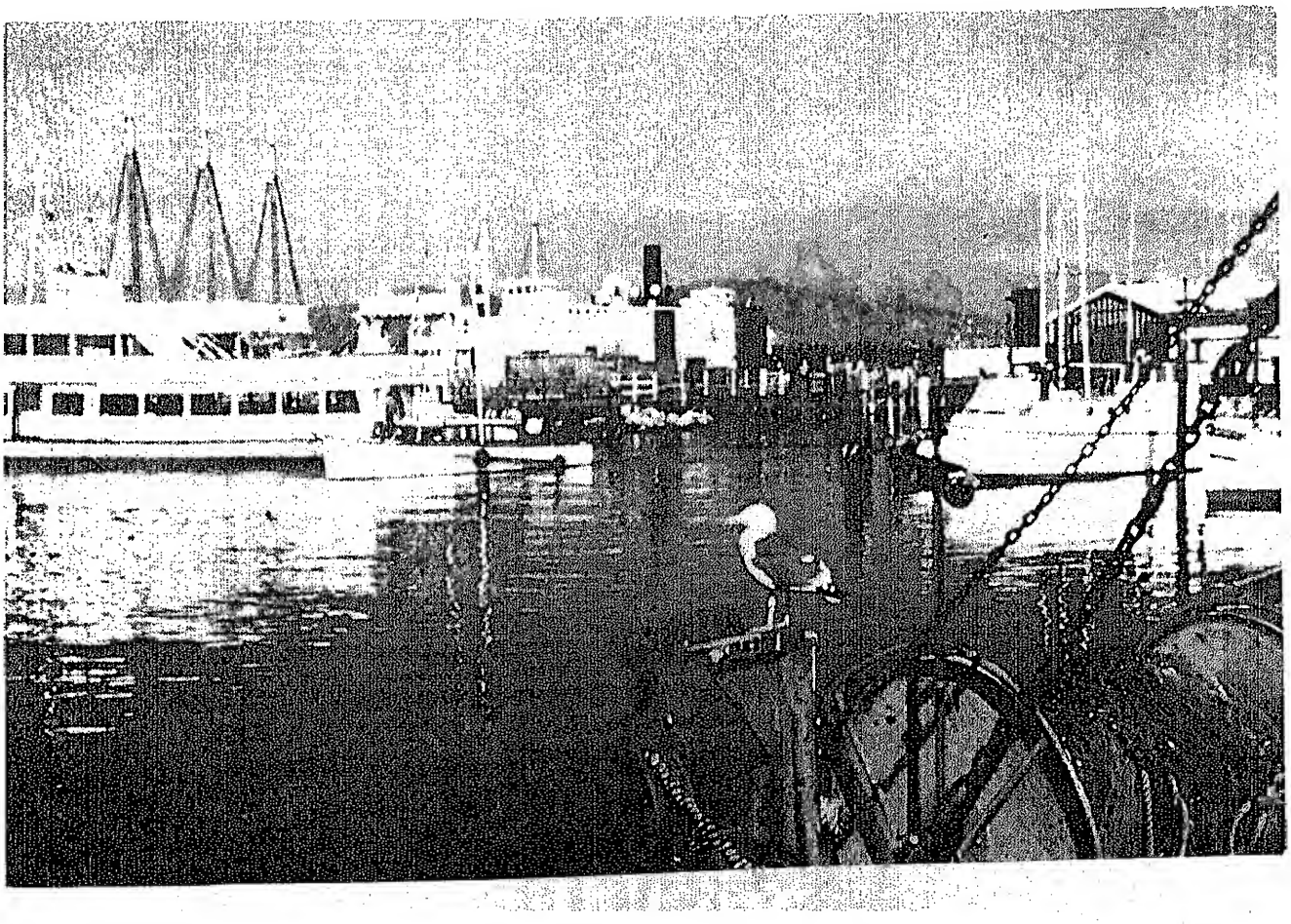
National Estuarine Sanctuary Program
Office of Ocean and Coastal Resource Management

Issuance: Varies.

Users: Congressional offices, Federal and State agencies, industry and public interest groups, academia, and the public.

For information, write or call: Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4255)

Site-specific *management plans* have been prepared for 5 of 15 national estuarine sanctuaries: Old Woman Creek, OH; Narragansett Bay, RI; Rookery Bay, FL; Jobos Bay, PR; and Carrott Island/Zeke's Island, NC. The other plans will be available at various times during FY 1984. These plans describe the goals and objectives of each site, research and educational activities planned, the facilities where programs take place, significant natural resources present and the management actions necessary to implement the plan. The plan is designed to inform the sanctuary users and the general public about the sanctuary and various activities planned over time. These plans are revised every 5 years.



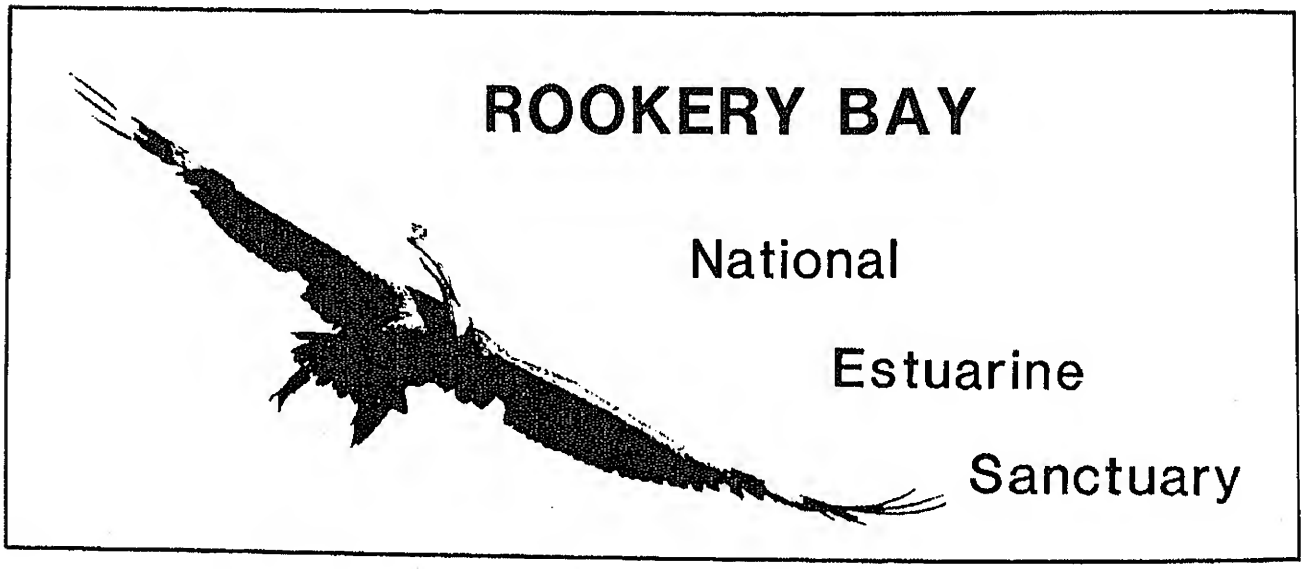
GENERAL INFORMATION BROCHURES
National Estuarine Sanctuary Program
Office of Ocean and Coastal Resource Management

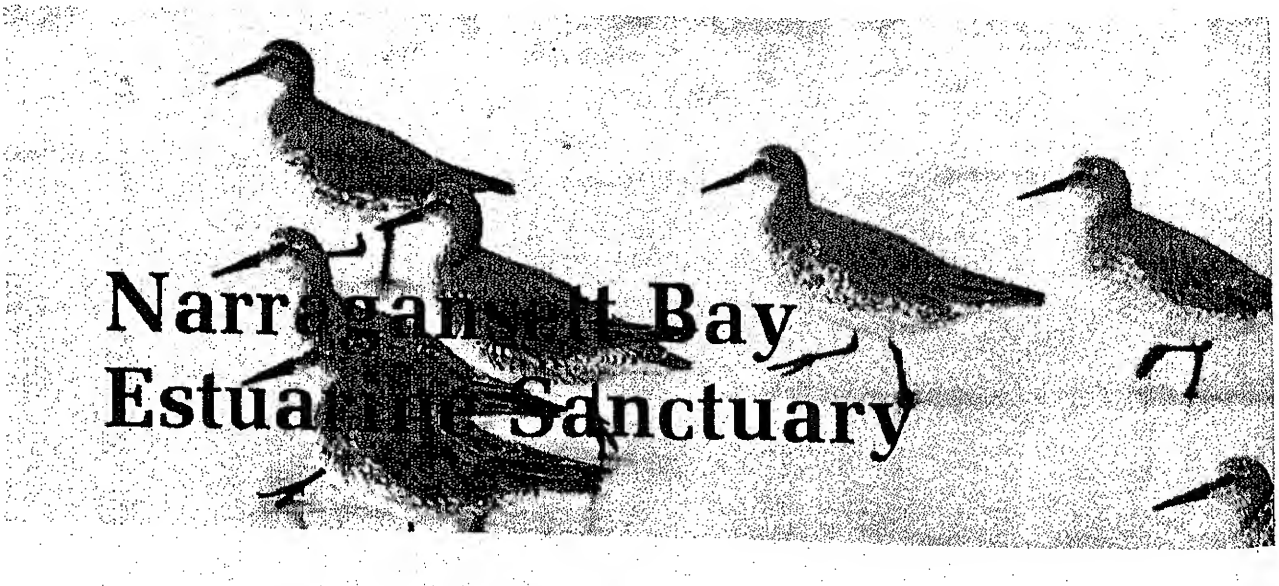
Issuance: Varies.

Users: Congressional offices, Federal and State agencies, industry and public interest groups, academia, and the public.

For information, write or call: Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4236)

Individual brochures are in the process of being prepared by States with designated national estuarine sanctuaries. Presently, brochures are available for the following estuarine sanctuaries: Narragansett Bay, RI, Rookery Bay, FL, and Apalachicola River Bay, FL. Others are planned for FY 1984. These brochures describe the location and significance of the site, research and educational activities conducted, and how the site is managed.





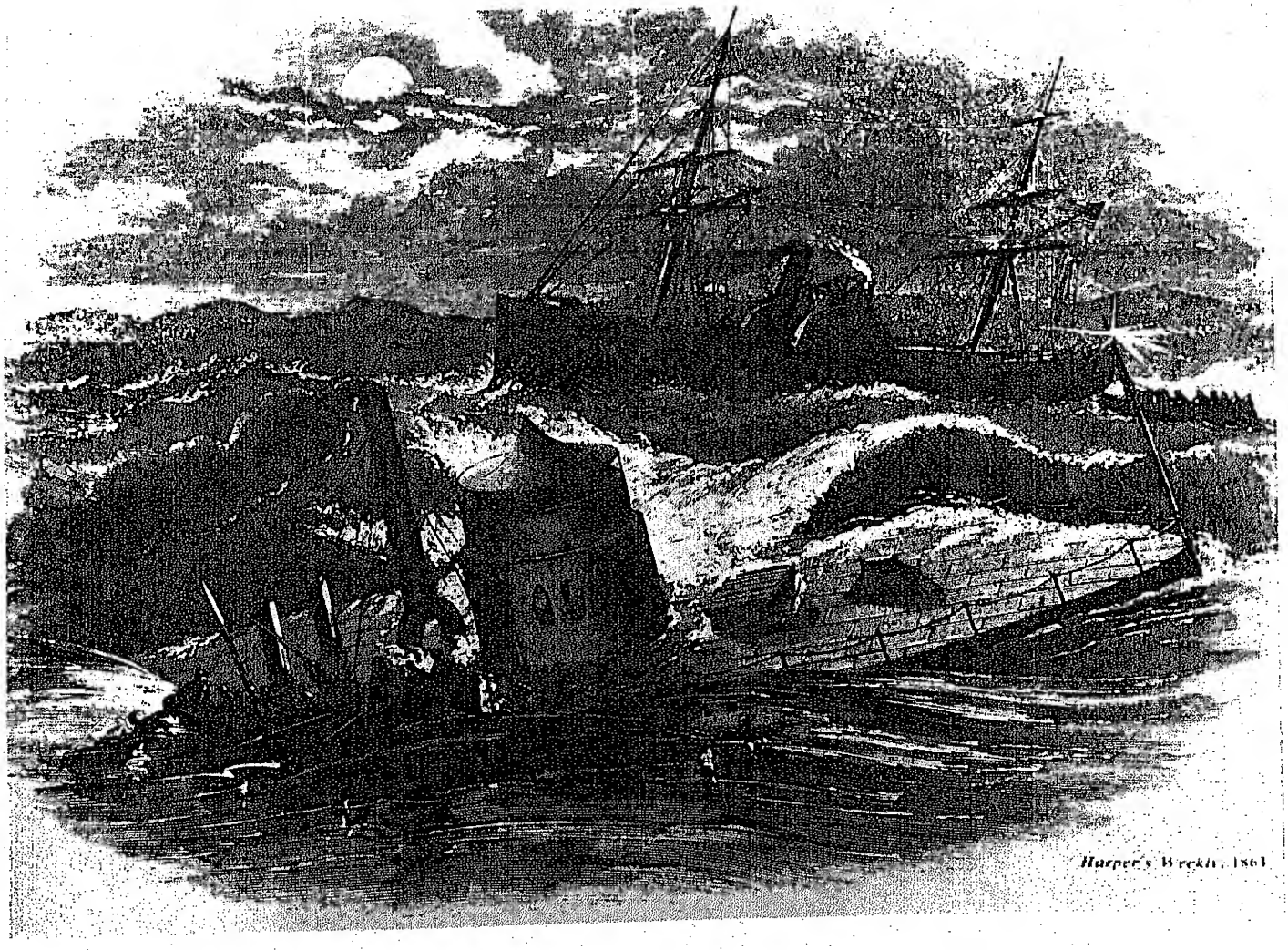
BIENNIAL REPORT
National Marine Sanctuary Program
Office of Ocean and Coastal Resource Management

Issuance: As required by Section 302(d) of Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended.

Users: President of the Senate, Speaker of the House of Representatives, appropriate Congressional offices, Federal agencies, academia, industry representatives, public interest groups, and the public.

For information, write or call: Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4236)

The *Biennial Report* sets forth a comprehensive review of the actions of the National Marine Sanctuary Program during the two previous fiscal years, together with appropriate legislation considered necessary for the designation and protection of national marine sanctuaries.



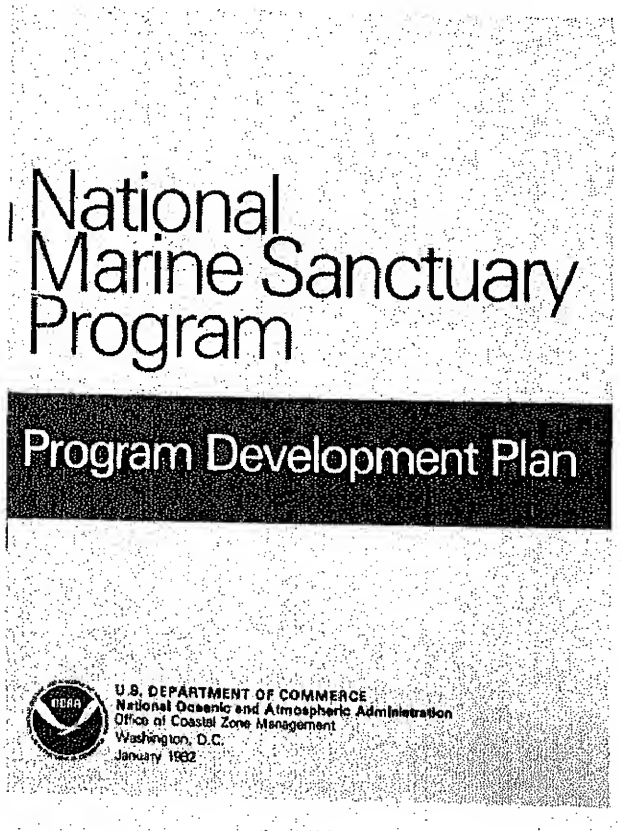
PROGRAM DEVELOPMENT PLAN
National Marine Sanctuary Program
Office of Ocean and Coastal Resource Management

Issuance: January 1982.

Users: Congressional offices, Federal and State agencies, industry and public interest groups, academia, and the public.

For information, write or call: Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4236).

The *Program Development Plan* (PDP) describes the policy and administrative framework for continued implementation of the National Marine Sanctuary Program. The PDP provides a description of the Program's mission, goals, and operational criteria and site evaluation process; the nomination and designation process; and the elements and purposes of site specific management plans.



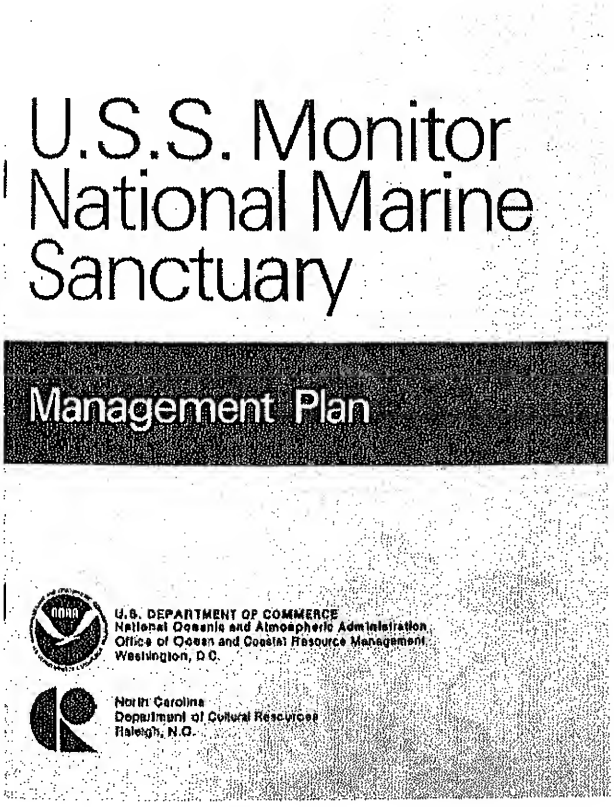
MANAGEMENT PLANS
National Marine Sanctuary Program
Office of Ocean and Coastal Resource Management

Issuance: Required under Section 922.31 of the National Marine Sanctuary Program Regulations, 15 CFR Part 922.

Users: Congressional offices, Federal and State agencies, industry and public interest groups, academia, and the public.

For information, write or call: Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4236).

Site specific *Management Plans* have been prepared on the six designated national marine sanctuaries—U.S.S. MONITOR, Key Largo, Gray's Reef, Looe Key, Pt. Reyes-Farallon Islands, and Channel Islands. These plans describe the degree of resource protection that is necessary for each site, the types of research and interpretive (and in some cases, recreational) activities that are anticipated, the facilities where programs take place, and the kind of management necessary to implement the plan. The plan is designed to inform the sanctuary users and the general public about the sanctuary and various activities that are planned over time. These plans are revised every 5 years.



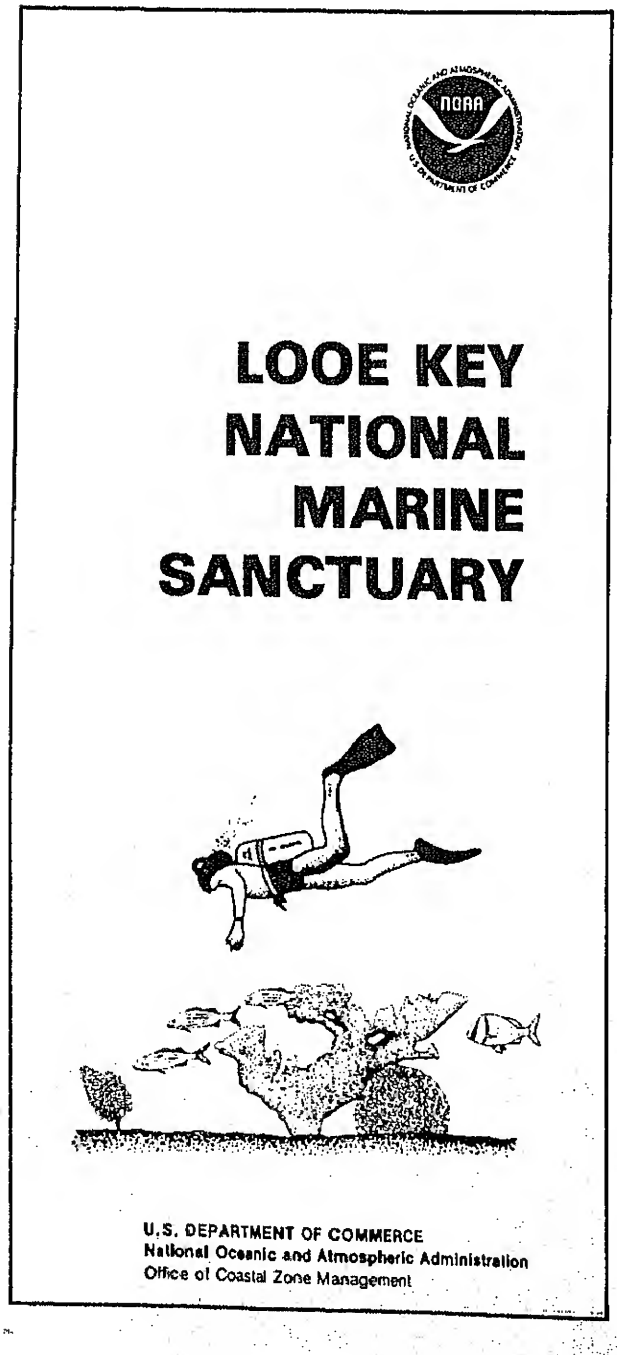
GENERAL INFORMATION BROCHURES
National Marine Sanctuary Program
Office of Ocean and Coastal Resource Management

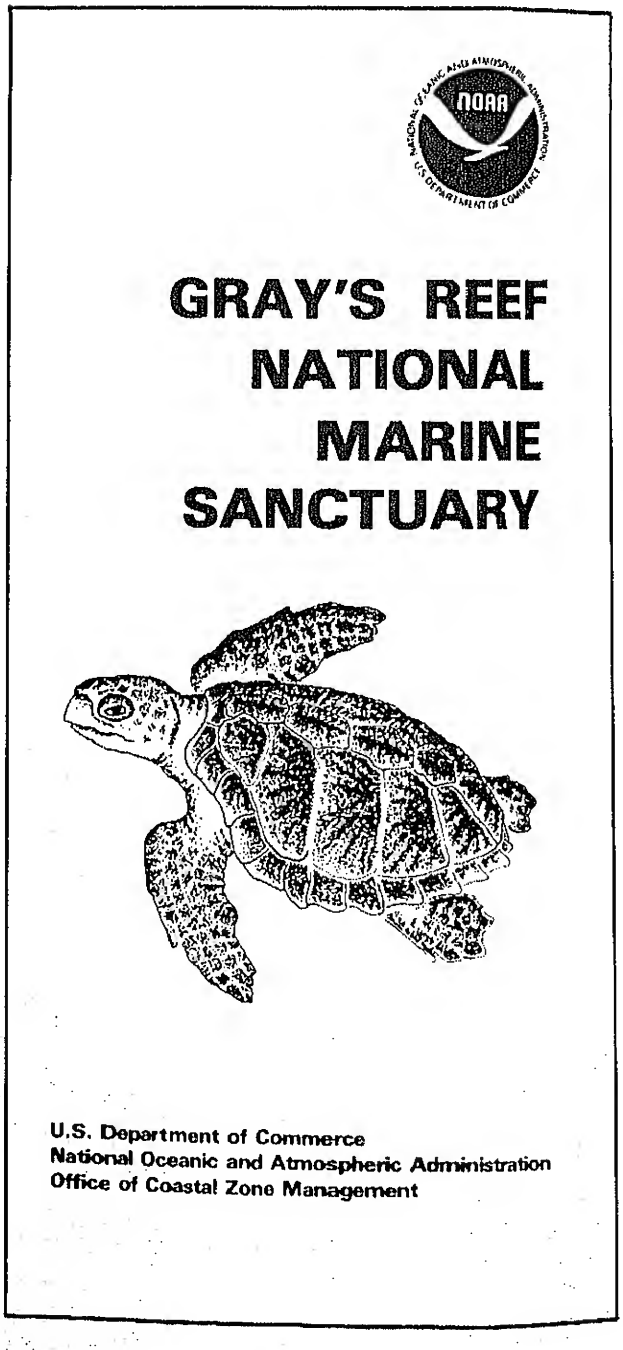
Issuance: Varies, revised as necessary.

Users: Congressional offices, Federal and State agencies, industry and public interest groups, academia, and the public.

For information, write or call: Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-634-4236).

Individual brochures for each marine sanctuary have been prepared summarizing the activities prohibited and permitted within the sanctuary, enforcement, and description of the significant material or cultural resources.





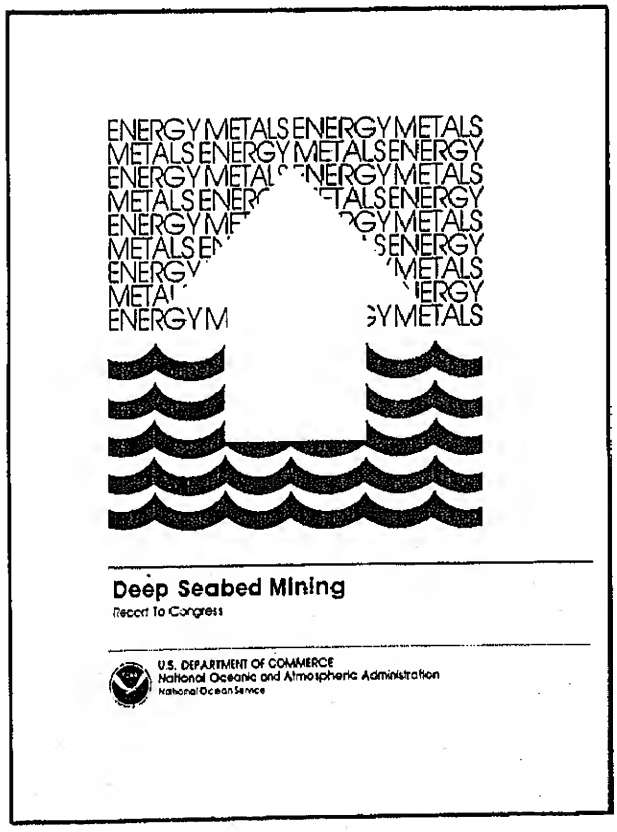
BIENNIAL REPORT
Deep Seabed Mining
Office of Ocean and Coastal Resource Management

Issuance: As required by Section 309 of the Deep Seabed Hard Minerals Resources Act. The current report was issued in December 1981. A subsequent report will be issued.

Users: The statute requires that the Report be sent to the President, the President of the Senate, and the Speaker of the House of Representatives. Other recipients are: appropriate Congressional offices, Federal agencies, State agencies, academia, environmentalists, industry representatives, and interested public citizens.

For information, write or call: Ocean Minerals and Energy Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA,3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-653-7695).

The *Biennial Report* describes NOAA's progress in implementing the Act, and its continued development of the deep seabed mining program in a legally sound and environmentally sensitive manner. The report includes NOAA's efforts in the negotiations of agreements with foreign Nations to facilitate reciprocating State agreements.



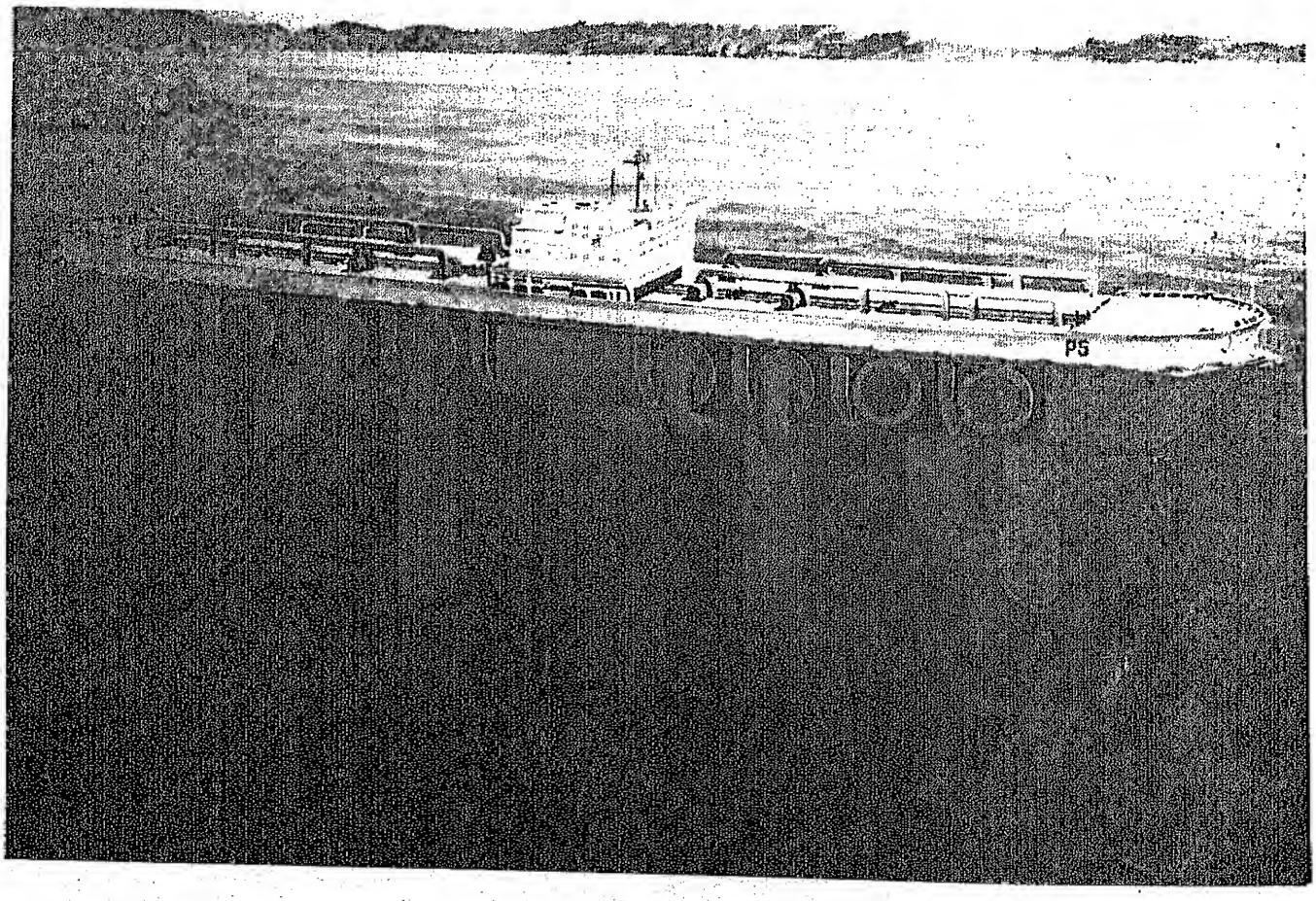
ANNUAL REPORT
Ocean Thermal Energy Conversion
Office of Ocean and Coastal Resource Management

Issuance: As requried by Section 405 of the Ocean Thermal Energy Conversion Act. The current report for FY 1982 was issued in March 1983.

Users: The statute requires that the Report be sent to the President, the President of the Senate, and the Speaker of the House of Representatives. Other recipients are appropriate Congressional offices, Federal agencies, State agencies, academia, environmentalists, industry representatives, and interested public citizens.

For information, write or call: Ocean Minerals and Energy Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA,3300 Whitehaven St., N.W., Washington, D.C. 20235 (202-653-7695).

The *Annual Report* describes NOAA's progress in implementing the Ocean Thermal Energy Conversion Act. Its background section discusses industry status and international competition. There are also chapters on OTEC engineering and technology, the legal regime, and environmental aspects.



Artists Rendition of an OTEC commercial operating plant.

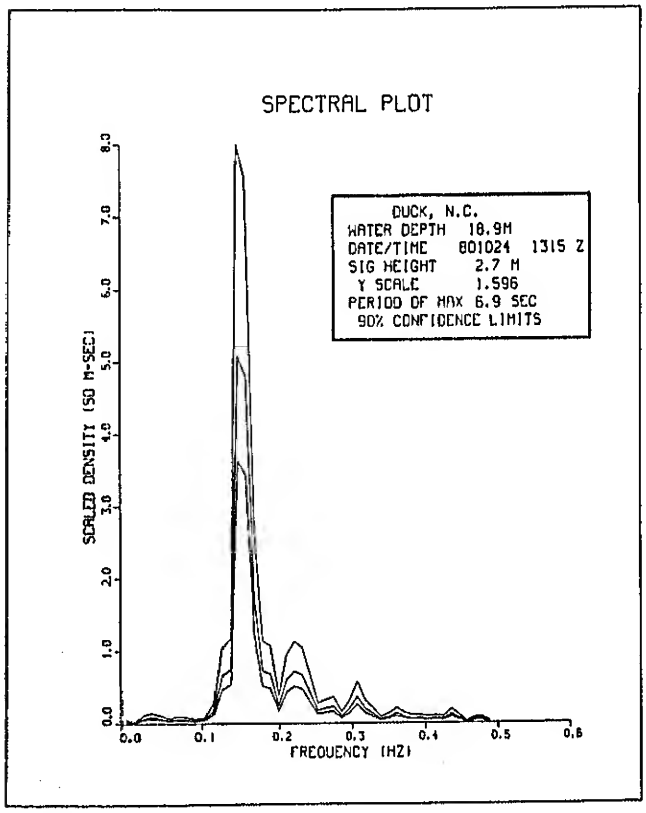
WAVE DATA AND STATISTICS
Office of the Chief Scientist

Issuance: On request at present, with periodic publications in the near future.

Users: Federal, State and local agencies, and private organizations involved in coastal or offshore engineering and construction, coastal erosion studies, wave energy studies, coastal hazards mitigation and assessments, environmental assessments, ship design, scientific research, and weather and oceanographic forecasting that supports coastal and offshore operations.

For information, write or call: Coastal Waves Program, Office of the Chief Scientist, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8474).

Wave Data and Statistics, a wave information program, provides field data and statistics from measurement stations in the U.S. coastal waters of the mid-Atlantic region. As this new program matures and is extended regionally, data for all coastal waters will be available for dissemination. The data included in this program are time series of wave elevation and spectra and statistics on wave heights, periods, extremes, persistence, and other similar wave characteristics.



MARINE OPERATIONS

The NOS Office of Marine Operations operates a fleet of major oceanographic and hydrographic survey vessels for use by NOAA, other Federal agencies, and academic institutions. It also provides ship support services to marine programs in nautical charting, marine assessment baseline studies, ocean dumping, oceanographic research, and living marine resources assessment and development to achieve a better understanding of the physical, chemical, and biological characteristics and behavior of the oceans and the seafloor, and the ocean atmosphere interface.

Ships of the NOAA fleet are identified by color scheme, by letter-number designator, and by the display of the NOAA logo on the superstructure. The vessels' hull and superstructures are painted white; masts and stacks, buff; and boot top and trim, black. Letter-number designators appear on both sides of the bow above the letters "NOAA." The designator is a three-digit number preceded by the identification number "R" for research vessels or "S" for survey vessels. The first number of the three-digit identification is the class grouping for NOAA vessels, determined from a combination of the vessel's gross tonnage and its main propulsion plant's rated horsepower. The remaining digits are the vessel's hull number.

An example of each of the six classes of NOAA ships is shown on the following pages, together with some basic information about each ship shown.

DISCOVERER
Class I

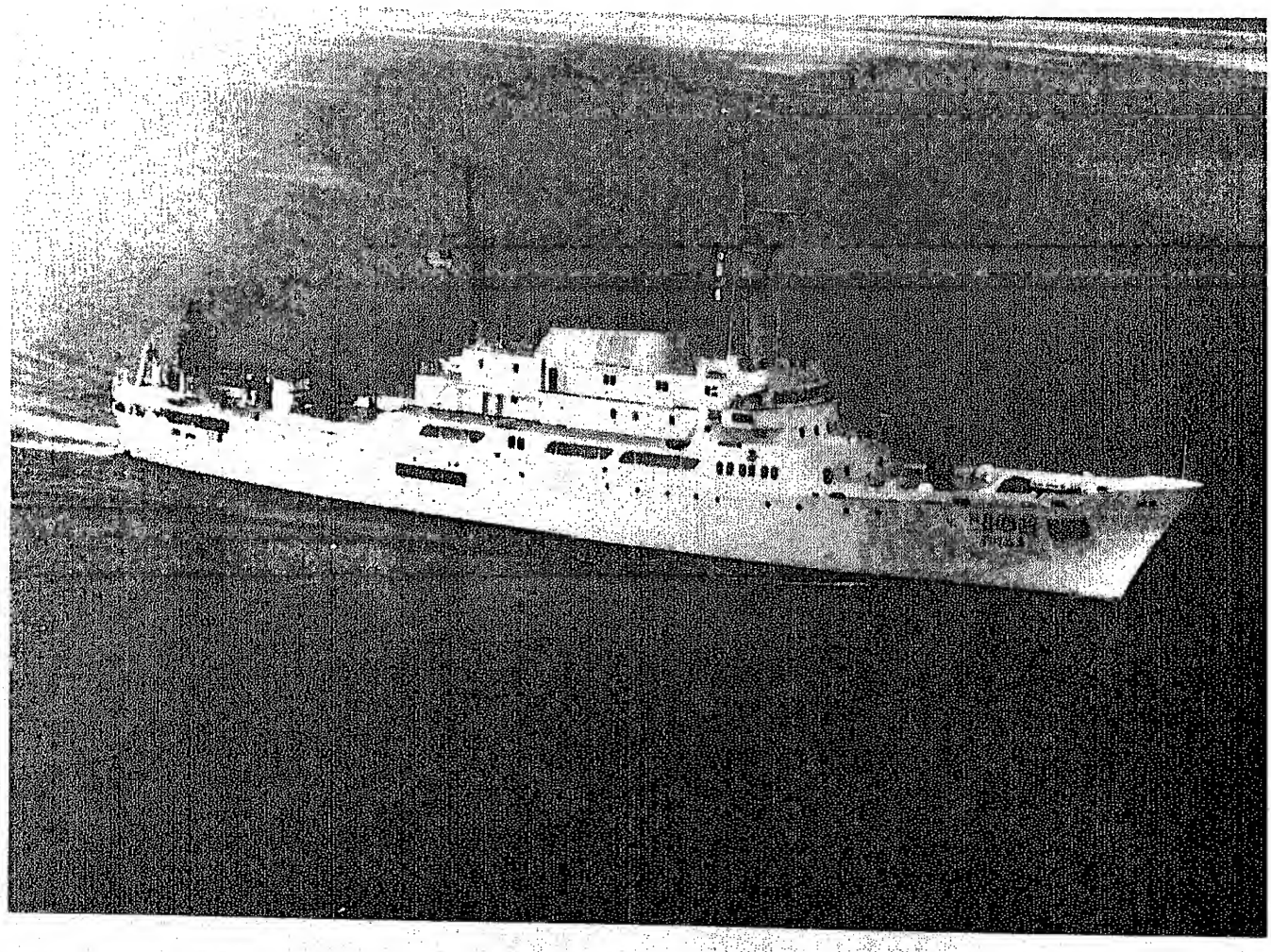
The NOAA Ship DISCOVERER conducts worldwide oceanographic research. The ship normally operates in the Pacific Ocean and the Alaskan waters.

Commissioned: April 1967
Designer: Maritime Administration
Builder: Aerojet-General Shipyards, Jacksonville, Fla.
Home port: Seattle, Wash.
Complement:
- Commissioned officers: 13
- Licensed offficers: 6
- Crew: 60
- Scientists: 24

Hull: Welded steel/ice strengthened
Displacement: 4,033 tons
Gross tonnage: 3,701
Net tonnage: 1,095
Length (LOA): 303 ft (92.4 m)
Breadth (moulded): 52.0 ft (15.8 m)
Draft, Maximum: 19.8 ft (6.0 m)
Cruising Speed: 15 kn
Range: 12,250 nmi
Power: 5,000 SHP

Class I Vessels

DISCOVERER
RESEARCHER
SURVEYOR



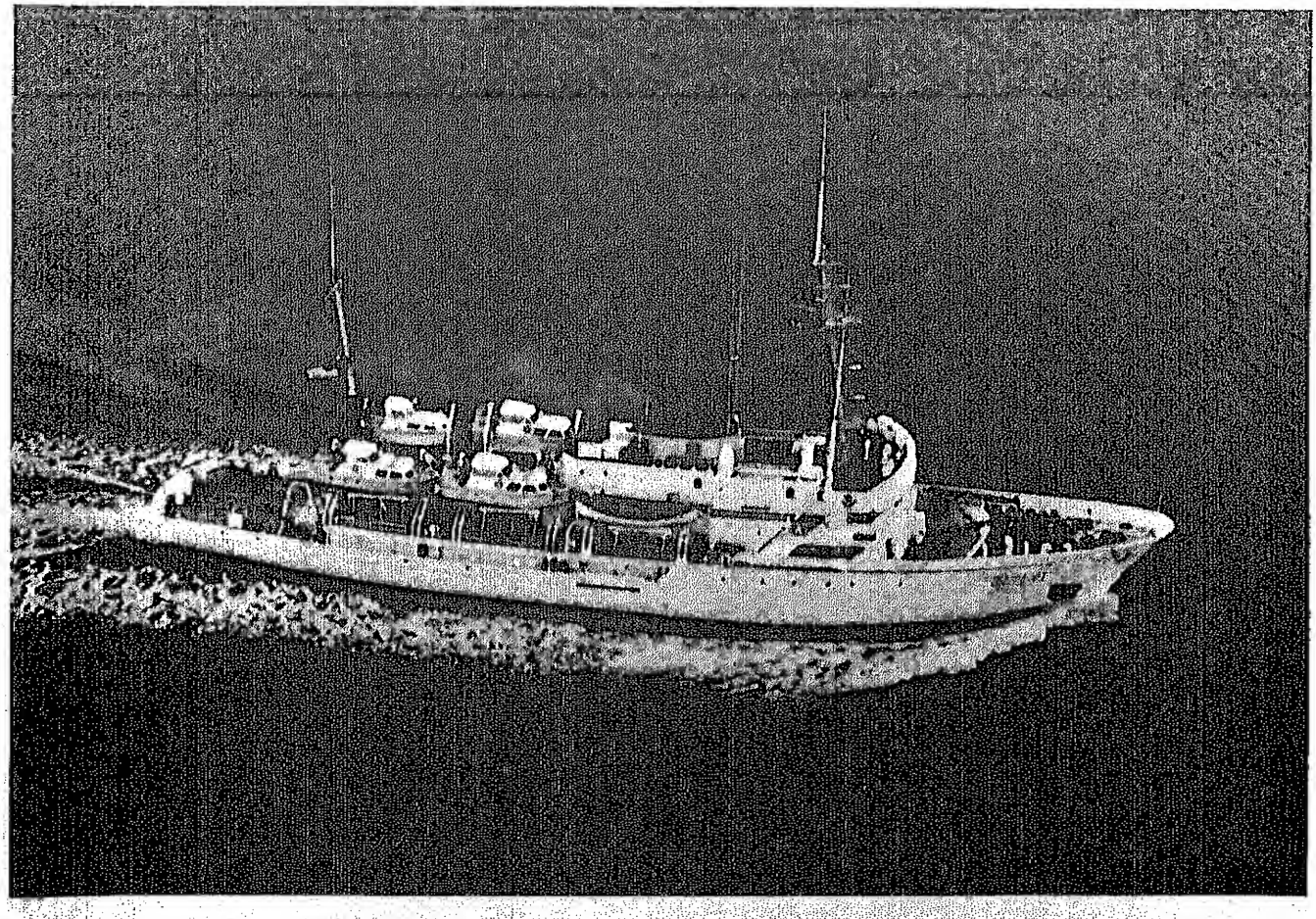
FAIRWEATHER
Class II

The NOAA Ship FAIRWEATHER is designed and outfitted for hydrographic surveys involving nautical charting. Scientific equipment normally on board is limited to equipment that supports and relates to these survey operations. The ship normally operates off the U.S. Pacific Coast, in Alaskan coastal waters, and off the Hawaiian Islands.

Commissioned: October 1968
Designer: Maritime Administration
Builder: Aerojet-General Shipyards, Jacksonville, Fla.
Home port: Seattle, Wash.
Complement:
  Commissioned officers: 12
  Licensed officers: 5
  Crew: 52
  Scientists: 4
Hull: Welded steel/ice strengthened
Displacement: 1,800 tons
Gross tonnage: 1,591
Net tonnage: 578
Length (LOA): 231 ft (70.4 m)
Breadth (moulded); 42 ft (12.8 m)
Draft, Maximum: 14.3 ft (4.2 m)
Cruising Speed: 13 kn
Range: 7,000 nmi
Power: 2,400 SHP

Class II Vessels

FAIRWEATHER
MILLER FREEMAN
MT. MITCHELL
RAINIER



DAVIDSON
Class III

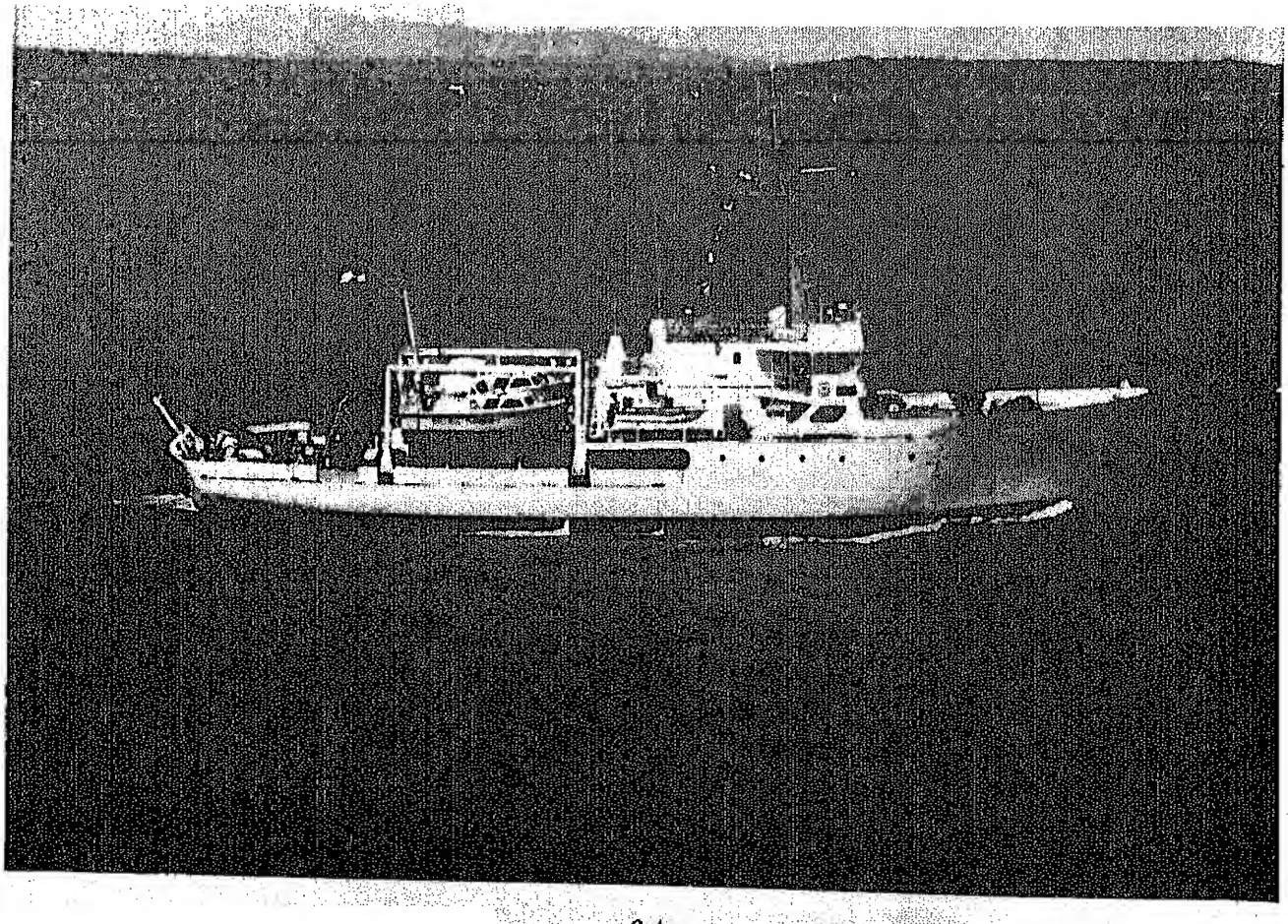
The NOAA Ship DAVIDSON is designed and outfitted for hydrographic surveys involving nautical charting. Scientific equipment normally on board is limited to equipment that supports and relates to these survey operations. The ship normally operates off the U.S. Pacific Coast and in Alaskan coastal waters.

Commissioned: March 1967
Designer: Maritime Administration
Builder: Norfolk Shipbuilding and Drydock, Norfolk, Va.
Home port: Seattle, Wash.
Complement:
- Commissioned officers: 8
- Licensed officers: 3
- Crew: 29

Hull: Welded steel/ice strengthened
Displacement: 995 tons
Gross tonnage: 854
Net tonnage: 207
Length (LOA): 175 ft (53.3 m)
Breadth (moulded); 38 ft (11.6 m)
Draft, Maximum: 13.3 ft (4.1 m)
Cruising Speed: 12 kn
Range: 6,000 nmi
Power: 1,600 SHP

Class III Vessels

PEIRCE
ALBATROSS IV
DAVIDSON
McARTHUR
OREGON II
WHITING



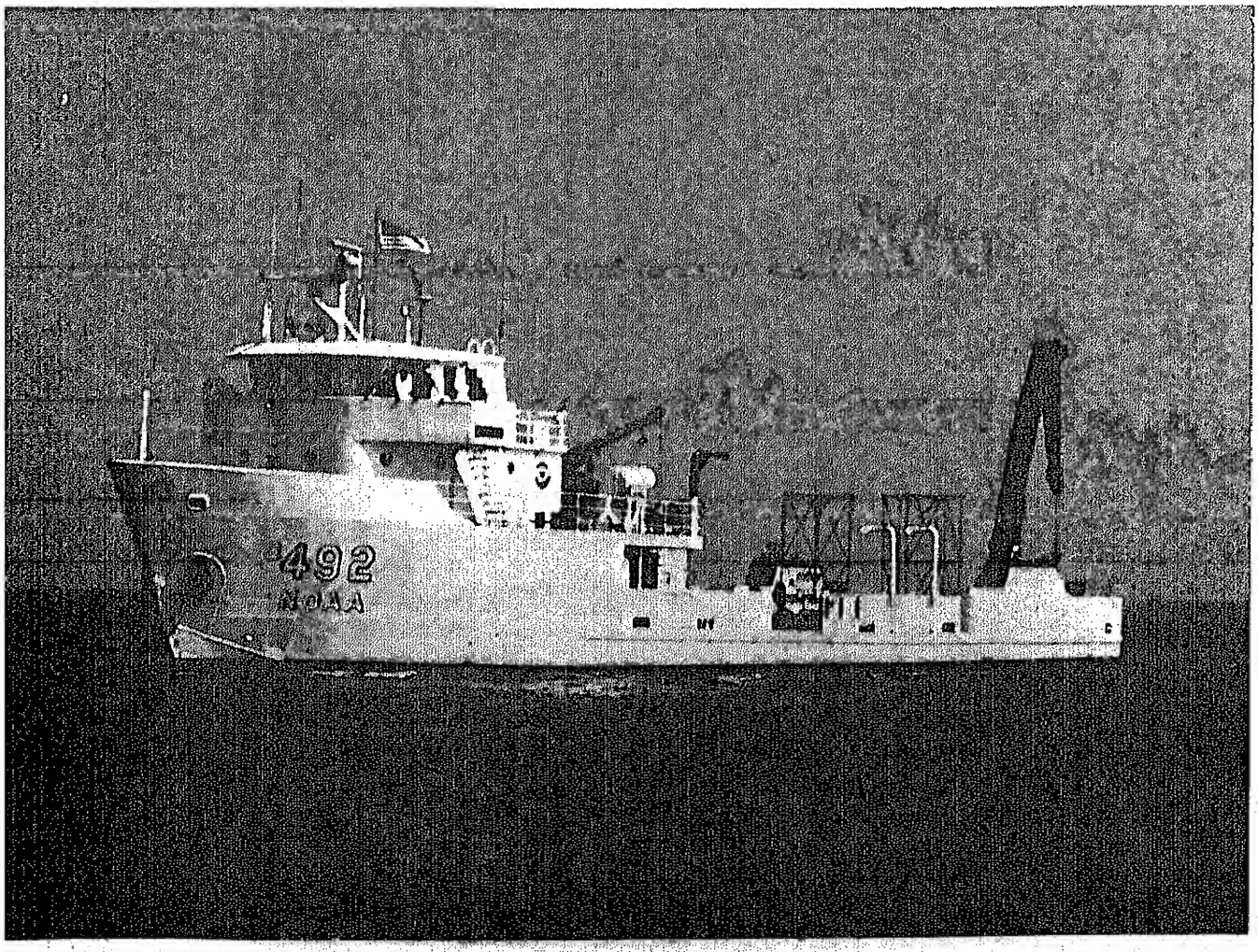
FERREL
Class IV

The FERREL conducts coastal and estuarine circulatory studies. The Ship normally operates off the U.S. Atlantic Coast and in the Gulf of Mexico.

Commissioned: June 1968
Designer: Zigler Shipyards, Inc.
Builder: Zigler Shipyards, Inc., Jennings, La.
Home port: Norfolk, Va.
Complement:
  Commissioned officers: 5
  Licensed officers: 2
  Crew: 12
Hull: Welded steel
Displacement: 360 tons
Gross tonnage: 349
Net tonnage: 86
Length (LOA): 133 ft (40.5 m)
Breadth (moulded): 32 ft (9.8 m)
Draft, Maximum: 8 ft (2.5 m)
Cruising Speed: 10 kn
Range: 2,200 nmi
Power: 750 SHP

Class IV Vessels

FERREL
TOWNSEND CROMWELL
DELAWARE II
DAVID STAR JORDAN
CHAPMAN



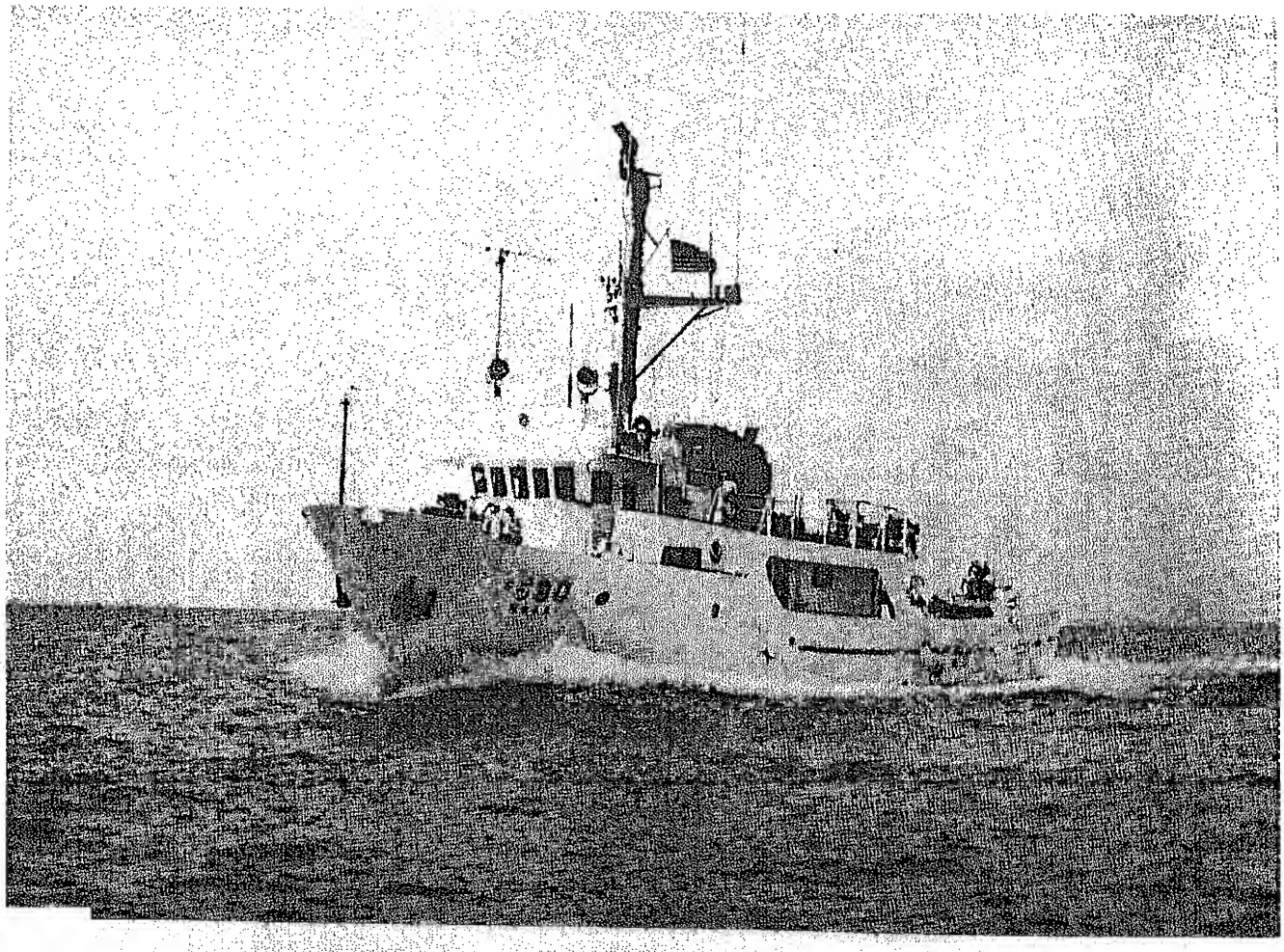
RUDE
Class V

The NOAA Ship RUDE operates with her sister ship, the NOAA Ship HECK, in making wire drag surveys and was built and outfitted for such operations. The vessels normally operate off the U.S. Atlantic and Gulf Coasts.

Commissioned: March 1967
Designer: Maritime Administration
Builder: Jakobson Shipyard, Oyster Bay, N.Y.
Home port: Norfolk, Va.
Complement:
  Commissioned officers: 3
  Licensed officers: 1
  Crew: 7
Hull: Welded steel
Displacement: 220 tons
Gross tonnage: 150
Net tonnage: 42
Length (LOA): 90 ft (27.4 m)
Breadth (moulded): 22 ft (6.7 m)
Draft, Maximum: 7.2 ft (2.2 m)
Cruising Speed: 10 kn
Range: 800 nmi
Power: 800 SHP

Class V Vessels

JOHN N. COBB
RUDE and HECK



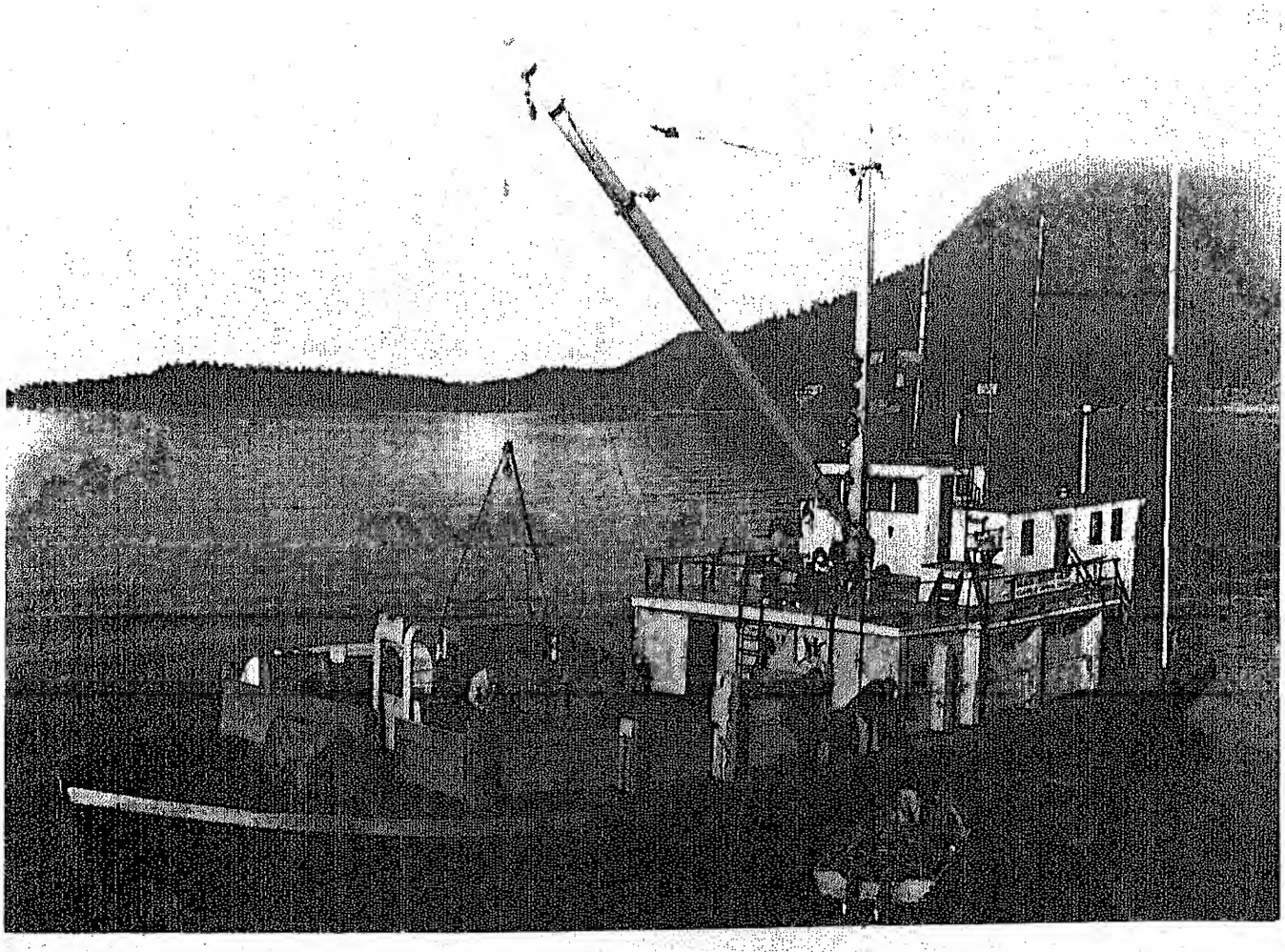
MURRE II
Class VI

The NOAA Ship MURRE II conducts fishery research and cargo shipment operations in Southeast Alaskan waters.

Launched: 1943
Designer: Converted from U.S. Army
Builder: Powered barge by Maritime Shipyards, Seattle, Wash.
Home port: Juneau, Alaska
Complement:
  Licensed officers: 2
  Crew: 1
  Scientists: 5
Hull: Wood
Displacement: 295 tons
Gross tonnage: 189
Net tonnage: 95
Length (LOA): 86 ft (26.1 m)
Breadth (moulded): 26.8 ft (8.2 m)
Draft, Maximum: 7.5 ft (2.3 m)
Cruising speed: 8 kn
Range: 1500 nmi
Power: 208 SHP

<u>Class VI Vessels</u>

MURRE II



OCEANOGRAPHIC RESEARCH, SHIP SUPPORT
Office of Marine Operations

Issuance: As required.

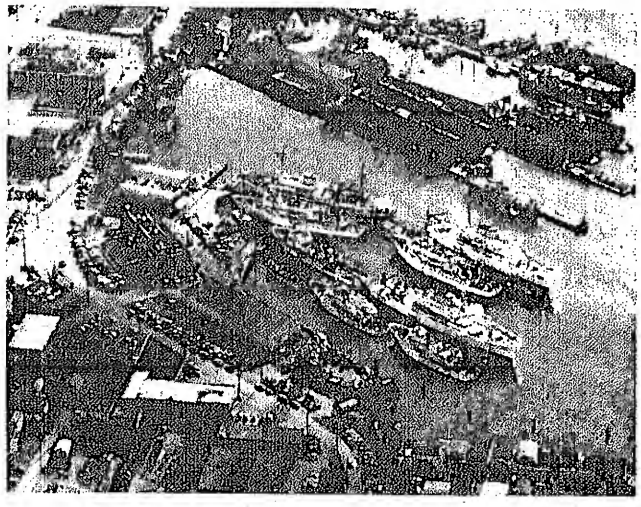
Users: Federal agencies.

For information, write or call: Office of Marine Operations, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8321).

Ship Support for oceanographic projects requiring a considerable amount of ship time, conducted aboard any of NOAA's fleet of 22 ships, is offered to other government agencies and academia on a reimbursable program and, occasionally, to private industry. In general, NOAA ships are heavily committed to NOAA missions, with only very limited amount of unused capacity available.

The NOS Atlantic Marine Center, Norfolk, Va., directs the activities of 10 of NOAA ships, and the NOS Pacific Marine Center, Seattle, Wash., directs the activities of the other 12 NOAA ships. The Centers support operations, logistics, ship maintenance, and administration, as well as process data from all facets of field operations.

Atlantic Marine Center



Pacific Marine Center

NOAA DIVING OFFICE
Office of Marine Operations

Issuance: Not applicable.

Users: Federal and State agencies, universities, and the commercial diving industry, together with physicians.

For information, write or call: Office of Marine Operations, National Ocean Service, NOAA, 6001 Executive Boulevard, Rockville, Md. 20852 (301-443-8007).

The *NOAA Diving Office* provides basic operational and specialized (polluted water and recompression chamber operation) diver training to State and other Federal agency personnel and to NOAA supported university and contract personnel. The Office also provides an equivalent certification for this training. In addition, it trains physicians in diving and hyperbaric medicine for support of governmentwide, commercial, and recreational diving activities and provides data on testing and evaluating polluted water diving equipment and procedures to other Federal agencies, academia, and the commercial diving industry.

ACRONYMS AND ABBREVIATIONS

'SM ..... American Congress on Surveying and Mapping
'D ..... Airport Facility Directory
'CSCC ..... Air Traffic Control Systems Command Chart
'S ..... Basic Hydrographic Survey
GS ..... Charting and Geodetic Services
IP ..... Coastal Energy Impact Program
RC ..... Coastal Engineering Research Center
S ..... Chart Evaluation Survey
..... Change Notice
E ..... Corps of Engineers
'D ..... Conductivity-Salinity-Temperature-Density
'P ..... Coastal Waves Program
M ..... Coastal Zone Management
A ..... Defense Mapping Agency
AAC ..... Defense Mapping Agency Aerospace Center
AH/TC ..... Defense Mapping Agency Hydrographic/Topographic Center
M ..... Electronic Distance Measuring
A ..... Environmental Protection Agency
..... Electronic Positioning Indicator
A ..... Federal Aviation Administration
..... Fisheries Conservation Zone
C ..... Federal Geodetic Control Committee
P ..... Flight Information Publication
..... Flight Service Station
3CO ..... General Bathymetric Charts of the Ocean
O ..... Government Printing Office
S ..... Global Positioning System
C ..... Instrument Approach Procedure Chart
..... Interstate Commerce Commission
..... Instrument Flight Rules
IS ..... International Polar Motion Service
W ..... Intracoastal Waterway
..... Lake Survey
W ..... Mean High Water
O ..... Management by Objective
T ..... Massachusetts Institute of Technology
MS ..... Minerals Management Service
..... Marine Pollution
AW ..... Minimum Safe Altitude Warning
C ..... Marine Weather Services Chart
D ..... North American Datum
S ..... Navigable Area Survey

ACRONYMS AND ABBREVIATIONS—Continued

NGIC ..... National Geodetic Information Center
NGS ..... National Geodetic Service
NM ..... Nautical Mile
NOAA ..... National Oceanic and Atmospheric Administration
NOS ..... National Ocean Service
NWS ..... National Weather Service
OC ..... Obstruction Chart
OCRM ..... Office of Ocean and Coastal Resources Management
OCS ..... Outer Continental Shelf
OMS ..... Office of Oceanography and Marine Services
OSS ..... Ocean Survey Sheet
OTEC ..... Ocean Thermal Energy Conversion
PDP ..... Program Development Plan
POLARIS ..... Polar Motion Analysis by Radio Interferometric Surveying
SAR ..... Search and Rescue
SC ..... Small-Craft
SID ..... Standard Instrument Departure
STAR ..... Standard Terminal Arrival Route
STD ..... Salinity-Temperature-Density
TR ..... Training Chart
USN ..... United States Navy
UTI ..... Universal Time
UTM ..... Universal Traverse Mercator
VFR ..... Visual Flight Rules
VHF ..... Very High Frequency
VLBI ..... Very Long Baseline Interferometry
WDS ..... Wire Drag Survey
WGS ..... World Geodetic System
WSO ..... Weather Service Office
XBT ..... Expendable Bathythermograph

PRICE LIST

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Great Lakes 7-Day Water Levels	free	
Great Lakes Water Levels-Annual Summary	$2.50	
Great Lakes Water Levels (1860-1980) Summary	$2.50	
Gulf of Mexico and Caribbean Planning Chart	$2.75	$5.50
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Instrument Approach Procedure Charts	U.S. set $30.00 First book $5.00 Additional book $2.50	U.S. set with one change notice $160.00 Individual regions: First: $37.50; Additional: $10.00.
International Nautical Charts	$4.50	
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Standard Terminal Arrival Charts	$2.00	$10.50
Storm Evacuation Maps	$3.50	
The Strategic Role of Perigean Spring Tides	$12.00	
Supplement Alaska	$3.00	$16.00
Supplement Tidal Predictions	$3.50	
Telemetered Water Level Data-- Great Lakes	free	
Territorial Sea and Contiguous Zone Maps		$2.15

PRODUCT	SINGLE COPY	ANNUAL SUBSCRIPTION
Tidal Bench Mark Sheets	Bench mark sheets (published) $2.00 per station (unpublished $13.00 per station.	
Tidal Current Charts	$4.00	
Tidal Current Diagrams	$2.75	
Tidal Current Tables	$5.50	
Tidal Zoning (Area Prediction Factors)	quoted on request	
Tide, Hourly Heights	Magnetic tape: Univac - (Tape costs $14.00 additional) $58.50 per station-month, $61.50 per station-year, $121.50 ten stations, $6.66 each additional year. Interdata 7/32- $28.64 per station-month, $28.64 per station-year, $5.34 each additional year. Xerographic- $15.00 per station-year, $1.30 per station-month microfiche- $32.00 per station-year, $2.50 per station-month	
Tide Observation Station List	quoted on request	

PRODUCT	SINGLE COPY	ANNUAL SUBSCRIPTION
Tide 6-Minute Heights	magnetic tape- $45.52 per station-month, $78.14 per station-year $99.35 three stations-year, $26.43 each additional year after three years.	
Tide Station Indexes	free	
Tide Station Ocean Temperature and Density	$18.00 per station-year; $2.50 per category.	
Tide Tables	$6.75	
Tides, Monthly Mean Summaries	$38.00 per station summary $1.30 per chart	
Tides, Time and Height of High and Low Water	$13.00 per station-year $1.30 per station-month Tide and Height of High and Low Waters and Hourly Heights combined--$20.00 per station year, $2.50 per station-month. Microfiche copy--$32.00 per station-year, $2.50 per station-month.	
Topographic/Bathymetric Maps	$2.50-3.25	
Topographic Surveys and Planimetric Shoreline Maps	reproduction fee $21.50	
U.S. Coast Pilots	$8.00	

PRODUCT	SINGLE COPY	ANNUAL SUBSCRIPTION
U.S. Gulf Coast Visual Flight Rules (VFR) Aeronautical Charts	$3.35	
Vertical Control Data	$2.00-$28.00 per quad	
Visual Aeronautical Chart Symbols Book	$2.00	
Visual Flight Rules Helicopter Chart	$2.25	
Visual Flight Rules/Instrument Flight Rules (VFR/IFR) Planning Chart	$6.00	$84.00 (2 year Subscription)
Visual Flight Rules Terminal Area Charts	$2.75	$11.00 (2 year Subscription)
Wave Data and Statistics	quoted on request	$6.00 (2 year Subscription)
World Aeronautical Charts	$2.75	$5.00

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